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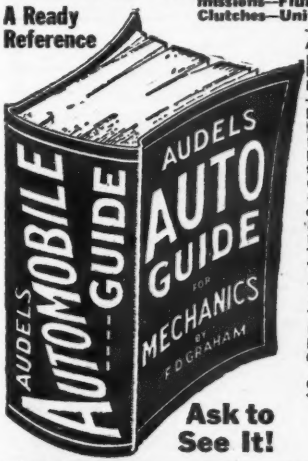

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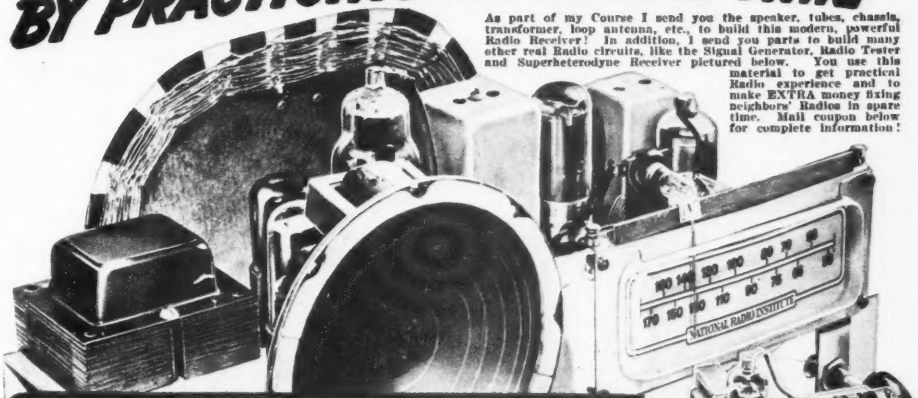

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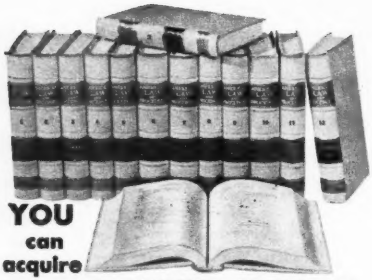

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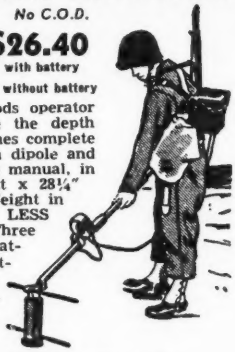

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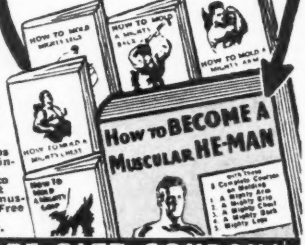

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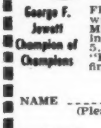

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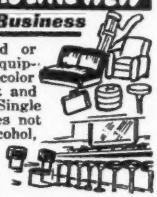

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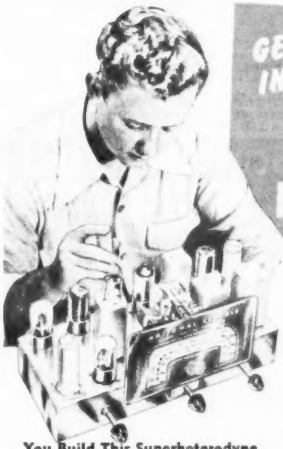

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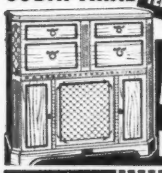

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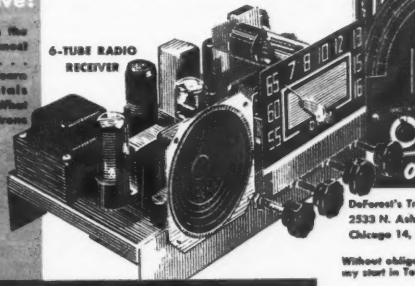

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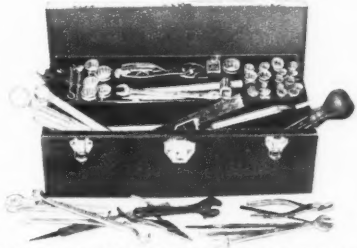

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The Editor's Workbench

Fred Horsley, MI's Science Editor, looks over candidates for This Month's Prize Gadget award submitted by inventors.

Move Over Doctor Gallup!

Having been one of the editors (Sports, not Poll) of the Literary Digest in 1936 when that periodical publicly prognosticated that a certain Alf Landon was going to be the next President of the United States—and also having been around, not protesting too much, last fall when the modern, scientific poll-takers were busy giving Tom Dewey the same job—your editor ought to have more sense than to let himself and MECHANIX ILLUSTRATED get snarled up with any more predictions. But as the man said when he stuck another quarter in the slot machine, "If I don't hit the jackpot this time, I quit." You see, it happened like this. . .

The snow was ankle-deep over the rough red bricks of the Indianapolis Speedway last winter when we got to talking with an undernourished character named Tom McCahill, who was teethed on a Mercedes spark plug and whose childhood chow was engine oil instead of Pablum. In short, MI's own automotive expert.

"Tom, who's going to win at Indianapolis next May?" said we, innocently.

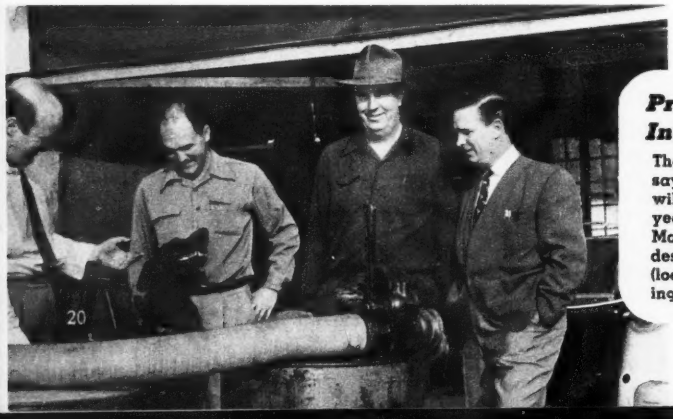
"Offhand, I don't know," said he, blanching slightly. "But I'll find out. And I'll pick 'em right—or else!"

So saying, Tom packed himself, his charming wife Cynthia and his Labrador retriever Wilbur Shaw into the McCahill Ford and headed, not for Indianapolis but for snowy California, where most of the top race drivers, designers and builders spend the winter getting ready for the 500-mile Memorial Day classic. Tom visited all the racing shops, talked to all his pals in the race car business and then came up with the predictions you'll find on pages 86-87 of this issue. Which issue, we might add, went to press more than two months before the race was to be run, May 30. If that isn't sticking our neck out, we're a monkey's uncle.

We won't repeat here the name of the driver Tom figures to cop top money except to say that in the picture on this page he's the handsome hombre on the far right and that we sure hope Tom hits the Nalon the head. (*See article for explanation of this ingenious pun*—Editor.)

If Tom's right, don't think we won't remind you of it every month from now until Doomsday. If Tom's wrong—oh, well, he can always

[*Continued on page* 37]



Preview of the 1949 Indianapolis Winner

The dapper gent at far right, says Tom McCahill (at far left), will win at Indianapolis this year, aided by teammate Rex Mays (looking at Tom's pooch), designer-builder Bud Winfield (looking at you) and refueling equipment (foreground).

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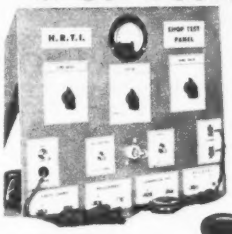

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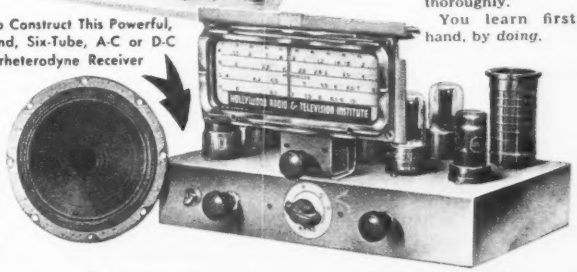

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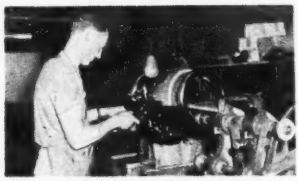

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YOUR INVENTION CLINIC

Conducted by Joseph H. Kraus

To facilitate the answering of their mail, readers desiring the advice of Mr. Kraus on inventions matters are requested to observe the following simple rules: 1) Type or write clearly, on one side of the paper. 2) Make sure that your full name and address, including street number and postal zone, if any, are on the letter and all accompanying papers. 3) Mail drawings or photographs flat, not rolled, and include postage if you want them returned. 4) Do not ask questions relating to patent laws. 5) Do NOT send models.

Address your inquiries to "Your Invention Clinic," MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y. Mr. Kraus will answer as many letters as possible in this column. His services are free.

Homemade Ammonia

Michael Filosa of Jersey City, N. J., wants to know if there's a simple way to make ammonia at home.

ANSWER: You can make stuff that will smell like household ammonia but it will not react the same way. The common household ammonia is a dilute form of ammonium hydroxide to which oleic acid, an alkali such as borax, and soap or some similar substance have been added to render the ammonia less volatile. Ammonium hydroxide is made by allowing ammonia, a gas, to pass through water.

We know of no safe, easy formula for making the gas at home. Get a good book on experimental chemistry and study the chapters on ammonia and ammonium compounds. Pay particular attention to ammonium sulfate—a common salt used as a fertilizer. Since ammonium sulfate contains 25 per cent ammonia, you might use this compound as a starting point for experiments in making ammonia at home.

Alcohol from Sawdust

J. Y. of Dorchester, Mass., queries us about synthetic alcohol: "In an article entitled Can Sea Farms Avert World Famine? (MECHANIX ILLUSTRATED for November, 1948) *is a statement that from wood waste one can make ethyl alcohol of a quality indistinguishable from that in choice whiskies. Can this be made from sawdust?"*

ANSWER: We can make edible glucose sugars from wood. In America as well as in Europe where the process originated, some candy makers have used such synthetic sugars in their products. By fermenting the sugars, you can get alcohol for whisky.

In the so-called Bergius process, 450 pounds of these sugars were reportedly produced from a ton of wood. Twenty per cent of the wood by weight becomes glucose during this process and about 45 per cent becomes alcohol or edible fodder.

The Scholler process, in operation at Eugene, Ore., has produced wood sugar and ethyl alcohol. This plant has a capacity of 4,000,000 gallons of alcohol annually and can use sawdust and the smallest of wood scraps as raw material.

Dr. Egon Glesinger, Chief of the Forest Products Branch of the Food and Agricultural Organization of the United Nations, gives a remarkable outline of the troubles that marked the introduction of the Scholler process into the United States in his new book, The Coming Age of Wood, just published by Simon and Schuster in New York City.

Use of sawdust and scrap wood should prove financially beneficial to the backers of any well run plant for synthetic sugar or alcohol. With further research, the operators should soon be able to make use of roots, terminal branches and everything in the tree, except perhaps the moisture.

Expanding Ring for Binders

Gladys Bennett of Wheatland, Pa., sends us a photograph of an adjustable ring for loose-leaf binders and asks how she can market her invention.

ANSWER: Where to dispose of an invention is a problem that worries many inventors. A device such as yours probably should be distributed by manufacturers of loose-leaf ring binders. But most of these manufacturers also produce their own rings or other fastening devices and would not want to market any model that they did not make themselves.

You might set yourself up in business and make the binders for the ring on which you now have a patent pending. In this case, you would need considerable capital, since you would have no immediate financial return from your invention. Even if you worked out the manufacturing problem, you would still have the job of selling your rings and binders.

Our recommendation is that you make up several better models, to show how the

[*Continued on page* 28]

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[*Continued from page* 24]

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New Gas Engine

Manfredo Giannotti of Piove di Sacco, Italy, asks about an engine with a compression chamber of variable cubic capacity, constant compression ratio and automatic timing mechanism. He would like to know what chance such an engine would have in the U.S.

ANSWER: If you can make a practical working model of this engine, it should show a real economy in gasoline consumption. But in America, quick getaway, super power, ease of riding, great stability and ability of operation under all sorts of weather conditions are more to be desired than economy of gasoline.

Your design may stand a better chance in Italy, France or even in a reconstructed Germany. In the U. S. A. we already have hundreds of engine patents and experimental models that can outperform combustion engines now in use, or show other elements of superiority over them.

Putting across a new design for a gasoline engine is almost an impossibility. American manufacturers are geared to large-scale production. Any new engine design demands scrapping millions of dollars of costly manufacturing machinery. It means, too, that mechanics must be re-educated to new designs that have not stood the test of time. In the past, costly manufacturing experiments of this sort usually have failed.

Electric Fire Alarm

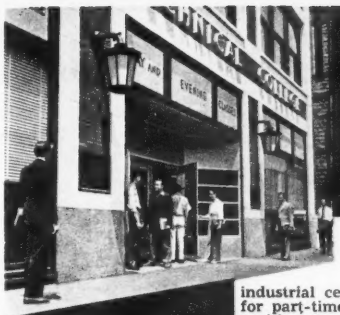
M. D. Gebert of Olympia, Wash., sends us diagrams for an electric fire alarm.

ANSWER: Only a search would indicate whether or not you can patent your invention. But we feel that you would merely be wasting your money in going ahead with this item. In your efforts to turn out a good alarm, you have introduced too many elements that serve no purpose.

Fundamentally you have an electrical switch that closes after heat affects the fusible link. Many other alarms are based on the same idea. If this link is made to hold two contacts apart, you can dispense with 75 per cent of the parts that you use and still get the same results.

Even a single zigzag of thread connected to a spring will do a better job and you will need

[*Continued on page* 30]



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Your Invention Clinic

[*Continued from page* 28]

only one switch to protect thousands of square feet of area. We are forwarding you a diagram for an alarm of this type. Better forget your design. It doesn't stand a chance, even if you can get it patented.

Tire-Pressure Indicator

Robert W. Kelley of San Leandro, Calif., sends blueprints of a device for indicating the pressure in a tire, that falls below the point at which the unit is set.

ANSWER: Your system is impractical. In the electrical setup you are duplicating effort. You are trying to make not only a warning device but also a pressure recorder. These are separate units. You have failed to show how you will tie up the pressure in the tire with electrical readings on the meter. If you could develop this feature, you wouldn't need the extra warning device, since the meter would do that job for you.

The whistle scheme is neither new nor good. Just when the pressure is getting low, you will make it still lower by wasting more valuable

[*Continued on page* 35]

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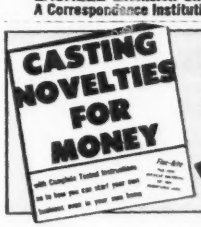

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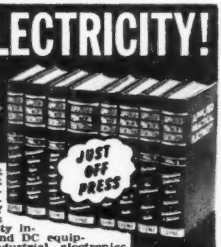

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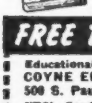

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Your Invention Clinic

[*Continued from page* 30]

air to blow the whistle. If a slow leak should occur during the night or while the car is parked in some lot far from your work, the tire would be completely flat before you got back to the car.

Remember, too, the pressure in tires varies a lot during normal operations. Pressure is highest on a summer day when you are traveling at high speeds. It drops considerably in the cool of the evening or during the winter—or even when you slow down during your hot-weather driving.

To be successful, your warning device must be simple and arranged so that anyone can install it. Even after the device proves its value in actual road tests, you should make a thorough investigation of the field before trying to market your invention.

Self-Heating Boot

Julius Savickas, Jr., of Minocqua, Wis., wants to invent a self-heating boot. He suggests a tablet that gives off the necessary heat for 24 hours.

ANSWER: If you could make a tablet do safely what you suggest, you wouldn't have to protect the design of the boot itself.

Just work on that tablet formula and patent it. Then the chemical combination would have millions of uses for hand and garment warmers, pipe-thawing systems, engine heaters and so on. And you could write your own ticket when the time comes for you to think about selling that formula.

Hoist for Dump Trucks

J. P. Holly of New Westminster, British Columbia, Canada, wants our opinion of an electro-hydraulic hoist for dump trucks.

ANSWER: Your photographs and report certainly make this idea look good. Installation of your hoist appears comparatively simple. Economy of weight, mechanical couplings and the use of metal in the fabrication of the device help to make your invention workable.

You have a valuable invention here and should be able to capitalize on its sale. We recommend a royalty arrangement based on a minimum yearly production and on a guarantee of a strong sales campaign.

Also give some thought to other engineering uses for the same basic construction. You probably have not considered these at all. Push this item to the best of your ability, even if you can't find a manufacturer interested in it. You have prepared the groundwork and can continue along the same lines. Your invention should pay dividends.

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Editor's Workbench

[*Continued from page* 20]

get himself a good job somewhere as a mechanic.

Lunch Before Breakfast, Atom

When that poet wrote "Backward, turn backward, O Time, in your flight" back in 1860, she must have had a premonition of Frank Tinsley's article, New York to San Francisco in Minus 3 Hours, which appears on pages 88-91 of this issue. Frank says that day after tomorrow, when big atom-powered airliners start ferrying passengers from Coast to Coast, you'll be able to take off from the East Coast and arrive on the West Coast three hours *before* you took off from the East Coast. To put it another way, you'll be able to have a noon lunch in New York and get to Frisco in time for a nine o'clock breakfast the same day.

Maybe that's the answer to man's quest for the Fountain of Youth. Just keep flying long enough and you'll be a baby again, ready to start the whole business of life over. Or will you? Come to think of it, you won't. But it's a fascinating idea, isn't it? Fascinating article, too. Don't skip it.

Correction

On page 69 of March MI we inadvertently accredited Eastman Kodak with the manufacture of a mechanical weather forecaster which resembles a slide rule. This new instrument is the invention of Dr. Irving P. Krick, well-known meteorologist, and is his property.

Hide Those MI's

Dear Editor:

A pressing situation has arisen about which I feel I should warn all male readers of MI. Your magazine was intercepted by my wife. So the warning is—"Watch out. It gives them ideas!"

My wife asked me if I had read the pages about your Pyramidal bookcase (August 1948) and I replied with a noncommittal "Yes." Then she asked, "Think you can make it?"

The site for my bout with the bookcase was the Navy's Mare Island hobby shop. Time of bout was 28 hours. Needless to say, the wife was delighted and she insisted I subscribe to MI. Being the victor at that point I didn't realize then that I was really beaten for now she intends to read every forthcoming issue and keep me working.

[*Continued on page* 41]

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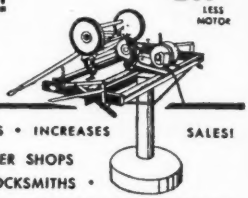

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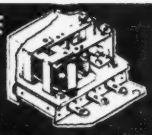

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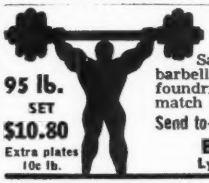

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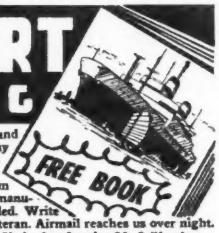

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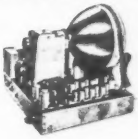

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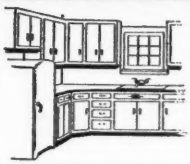

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Editor's Workbench

[*Continued from page 37*]

I admit, we have a marvelous bookcase now. But, please, Editor, don't publish plans for a seven-room house!

Thomas Warren C.T.C., U.S.N.
U.S.N. Communication Station
Skaggs Island
Sonoma, Cal.

In deference to Reader Warren, MI will not publish plans for a seven-room house.

Wanna Own a Gold Mine?

Dear Editor:

A few years ago, while I was prospecting in British Columbia I found various minerals in different places such as Diamond, Oil, Gold, Asbestos, Copper, Gypsum and Tin. But they all took money to open up so I just had to go off and leave them alone.

Would you be so kind as to forward this letter to someone who is looking for good mineral locations. Thanks.

Walter J. Larson
Box 372
Wrangell, Alaska

Now if you MI millionaires will just form a line to the left. . . .

Hear Your Own Heart

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The sound will fool you if you are expecting a "lub-dub." It sounds like faint gasping.

The reason you can hear it is because the ear drum is richly supplied with blood vessels, according to Dr. Robert W. Lawson.

Each surge of blood through the arteries of the ear drum makes the drum swell slightly. Each of these movements causes a little tap of the hammer bone in the middle ear which in turn starts the chain of stimuli that you recognize as sound.

Dr. Lawson first became aware of the ear giving a sensation in response to the heartbeat when he was tuned in on the radio. Listening to a humming sound when the program was not on, he was conscious of a rhythmic pulsation in the intensity of the humming. Then, when burning damp logs in the fireplace, he noticed a similar rhythmic pulsation in the sound of the steam escaping from the ends of the logs.

When he felt his pulse, he found that the pulsation from the radio was in time with that from the fire, and both were the same rhythm as his heartbeat. ●

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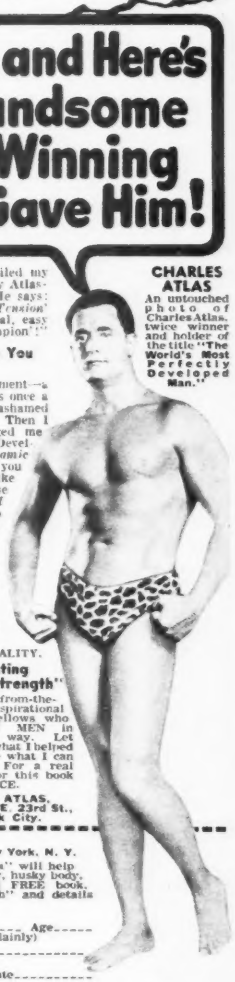
CHARLES ATLAS,
Dept. GT, 115 E. 23rd St., New York City.



CHARLES ATLAS
An untouched photo of Charles Atlas, twice winner and holder of the title "The World's Most Perfectly Developed Man."

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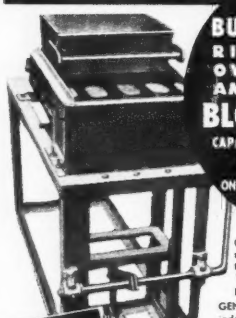

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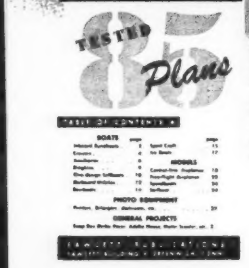

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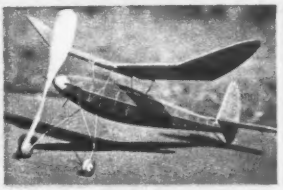

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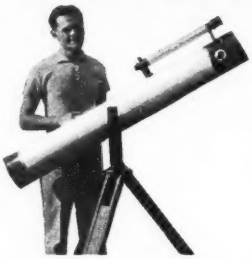

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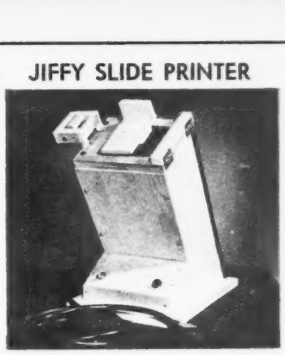

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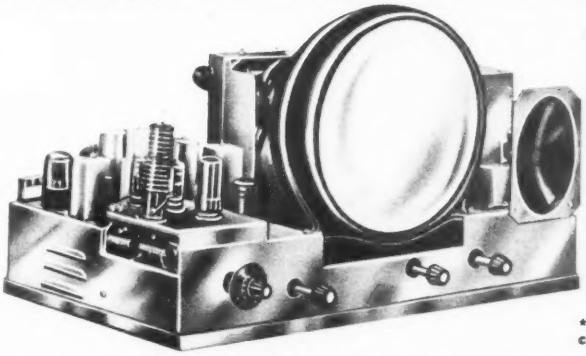

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Want a television set for yourself? Want to assemble them for resale at a profit? The new Transvision Model 10A electromagnetic Television Kit (illustrated above) is ideal: Gives a bright, stable 52 sq. in. picture. Has 10" picture tube, and **CONTINUOUS TUNING** on all 12 channels. Its high sensitivity makes for improved long-distance reception; especially good on high channels. Comes **complete** with **all-channel double-folded dipole antenna and 60 ft. of lead-in wire.**

Transvision **MODEL 10A TV KIT,** less cabinet.....$199.00

Transvision **MODEL 12A TV KIT,** same as above, but has a 12" picture tube $239.00

for Transvision Model 10A or 12A TV Kit. Made of select grain walnut with beautiful rubbed finish. Fully drilled, ready for installation of assembled receiver.

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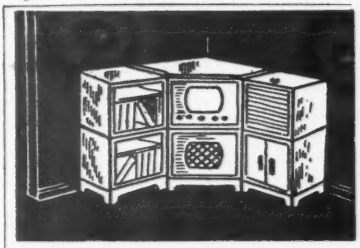

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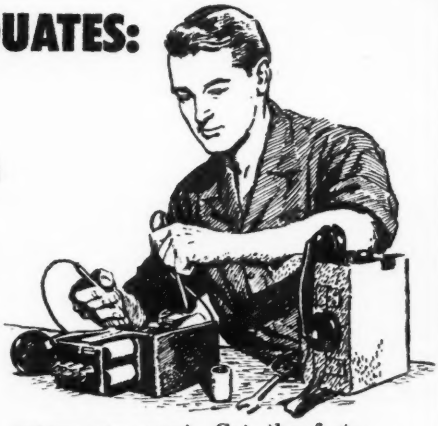

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BEFORE his arrest Cardinal Mindszenty had the look of a serene man of God.

AFTER his trial for treason began, he had a haunted look. Was he drugged?

Do Truth Drugs Really Work

The "talking needle" revealed the innocence of an apparent murderer. Can it betray the secret of the treason trials?

By Carlton Brown

WHY did Cardinal Mindszenty of Hungary suddenly confess in open court that he was guilty of treason?

Why did the Protestant ministers in Bulgaria confess in their public trial that they were guilty of spying?

Why do Communist-controlled courts get both comrades and enemies to admit freely that they are guilty of whatever charges are laid against them?

Have the Communists discovered a new and sinister "truth drug"—one that breaks down a man's judgment and moral resistance so that he is easily convinced even the most fantastic charge against him is true?

Sodium pentothal and sodium amytal,

the truth drugs, have even stirred a controversy in this country as to their value in criminal confessions and amnesia cases, and they might make the accused talk without any inhibition.

The combination of some will-depressing drug with a new, hypnotic stimulant of the truth-drug type, however, might cause a defendant to believe as a fact whatever the prosecutor wanted to drill into him. For instance, scopolamine, the twilight sleep formerly used for easing childbirth pain, and morphine, used together might make a person forget specific things or start a pleasant dream. Added treatment with a "pep-pill" stimulant, such as benzedrine, might then make the defendant accept ideas that went against his reason and hear voices that might force him to confess to almost anything. Such crazy ideas and hearing voices are among the symptoms seen in patients who took benzedrine to get a "lift."

But neither pentothal, amytal, nor any other drug yet known to Western medical scientists would make him deny his earlier statements and publicly turn against his past way of life—as the Cardinal, the Bulgarian ministers and other defendants have done when brought to court by the Communists.

So far, medical men have found no direct evidence of the use of drugs in the Mindszenty case. Selden Chapin, American Minister to Hungary, said on his return from Budapest he had no way of verifying reports that Cardinal Mindszenty "actually was under the influence of drugs at his trial."

But look at the tragic contrast between the serene, smiling face of the Cardinal before his arrest and his tense, haunted face during his trial (see page 57)—and you will see why the idea that the Cardinal and his fellow-defendants were drugged into their public confessions persists so strongly. Lieut. Col. Walter G. Rishel, former U. S. air attache in Hungary, who knew the Cardinal "very well" and flew him to Rome when he got his red hat, said he would not recognize the Hungarian prelate by the photos taken at his trial.

"His whole life belies what he said in court and what he says now to the Communist-run Government of Hungary," Colonel Rishel declared. "That confession was entirely different from what he stands for."

That statement also could apply to the other star confessors behind the Iron Curtain. The long, detailed pleas of guilt run contrary to both the personality and the known facts about the defendants. American and British officials in Sofia who have been studying the trial of the 15 Bulgarian church leaders hold these confessions are false and cite many absurdities in dates and in the names of former colleagues.

The Rev. Vasil Ziapkov, for instance, "confessed" that he had talked with certain Americans at times when they had already permanently left their posts at Sofia. He also gave a dramatic recital of a "talk" he had with Louis Beck, long before he ever reached Sofia to start his job as Commercial Attaché at the U. S. Legation.

Western observers are at a loss to account for such incredible confessions.

If a new serum is the secret weapon that the Soviet satellites are using to secure these confessions, it probes dangerously farther than our own truth drugs into the inner workings of the mind and not merely exposes hidden facts but distorts the subject's basic personality and gives him a deep sense of guilt. After a confession "treatment," even the strongest anti-Communist personality seems to crack and become a virtual puppet that will perform in public according to the Communist will.

In a democracy like our own country, no truth drug could be used for such sinister purposes. Fortunately, our Constitution forbids any form of forced confession, since no American can be compelled to bear witness against himself. Thus, a defendant in a U. S. court can never be given a truth drug without his consent. Despite this legal limitation, our truth drugs, sodium pentothal and sodium amytal, have turned up some surprises fully as strange—if not as tragic—as those sensational treason trials abroad.

Last November, a young Air Force sergeant faced death in the gas chamber at San Quentin for the fatal stabbing of his pretty wife, Barbara. He was found standing over her corpse with a bloody butcher knife in his hand. He had no memory of what happened on the night of the murder. Before the crowded courtroom in Martinez, Calif., Sergeant Kenneth Long testified:

"I can't say definitely that I did, or did not, strike the blow that caused her death. But, from the looks of things, I must have done it."

The next day, [*Continued on page* 146]

William Heirens, the 17-year-old college student who thought he could outsmart science, collapsed when the truth drug exposed his crimes.

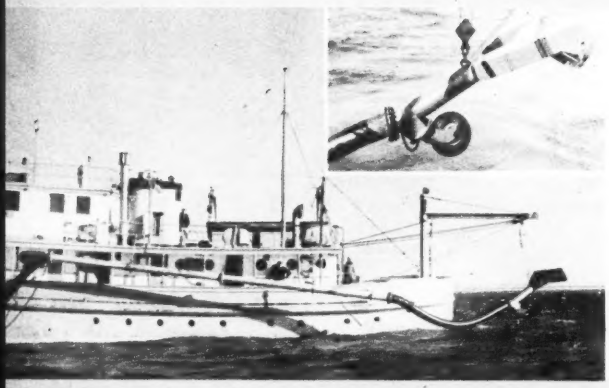
Even Sergeant Long himself, right, thought he had murdered his wife, Barbara, above, when he was found standing over her corpse with a bloody knife.

On their way to death in the Sing Sing chair, the Mad-Dog Espositos lived up to their name. In a truth-drug test they finally talked—but only like babbling babes.

NEW in SCIENCE

Solo Light needs no electricity—it works entirely by chemical reaction. Liquid mercury and phosphor particles are sealed in rare gas at low pressure. Just shake tube and there shall be light—fluorescent, too. Duro Test Corp., North Bergen, N. J.

Spud Snatcher is especially designed to prevent aching backs among the farmhand population. It's a mechanical potato harvester which can be operated by only one man. This picker, capable of harvesting four acres of spuds in one day, was developed to bring in Britain's big potato crop. Lion Stamping Company, Marshgate Lane, Stratford, London E. 15.



Oyster Hoister harvests tasty sea creatures by sucking them up like a giant vacuum cleaner. The machine (inset) is pulled along the ocean bottom by a ship and draws in sleepy oysters lying a-bed. It also captures boring snails—destructive oyster pests. The device catches 1000 bushels of oysters an hour and cuts manpower requirements in half. H. C. Rowe & Co., New Haven.

Hydro-Scoop is a 10-cubic-foot shovel which uses hydraulic power to scoop up earth and other bulky products. It takes a bite 24 inches deep. The fact that it's reversible makes it easy to get in close to buildings. Stockland Road Machinery Company, Minneapolis.

Swelled Head? No, she's just a hot head. Pretty Irene Schoenig is blowing her top in a home dryer which does its job in 10 to 30 minutes. The striped headgear is not a chapeau but a blower which contains, of all things, hot air. Ware Distributing Company, of Chicago, Illinois.

Rocket Snozzle juts forward from Lockheed's Shooting Star jet fighter. The missile's flaming thrust escapes through an opening in the underside of the nose while a special fire wall protects the pilot. There are banks of multiple smaller rockets under each wing, too.

Two-Story Bomb is called the atom bomb's big brother. It weighs over 20 tons but it's just about one-thousandth as destructive as the atom bomb whose explosive charge weighed about 25 pounds. Man at left holds an indoor baseball—about the size of the atom bomb's charge. Man at right isn't holding up bomb—it's dangling from a strong chain.

This is not a gallows but a gadget to add to your height (and subtract from your wallet). Although many were sold, the device succeeded only in giving buyers stiff necks.

Danger!

Quack gadgets cost you millions of dollars each year. Here's the official story, told to James Miller by George P. Larrick (above) Associate Commissioner of the Federal Food and Drug Administration.

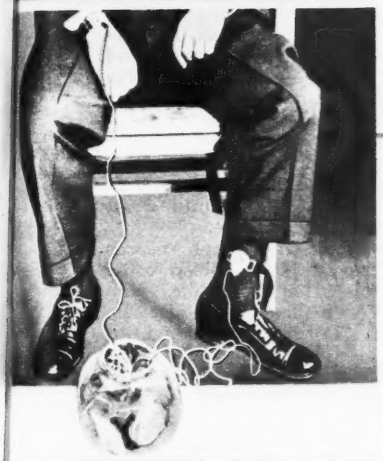
MILLIONS of dollars are filched from your pockets every year by promoters of quack health devices. And even worse, probably hundreds of people become seriously ill, and some die as a direct or indirect result of cure-alls for every ailment known to man.

For 10 years, one of the important jobs of the Federal Security Agency's Food and Drug Administration has been to force these people out of business. Have you ever considered buying a mechanical heart, a lamp which produces desert air, a height increasing gadget or an electric belt which cures everything? No, I'm not joking—these are contraptions, some of which are utterly worthless or even harmful to the user but which made

Witch Doctors Are Back Again

Mechanical heart was supposed to perform miracles. All it did was give you electrical (and financial) shock.

Hay fever machine was acclaimed as a boon to the stuffed-nose set. It was medicinal as glass of water.



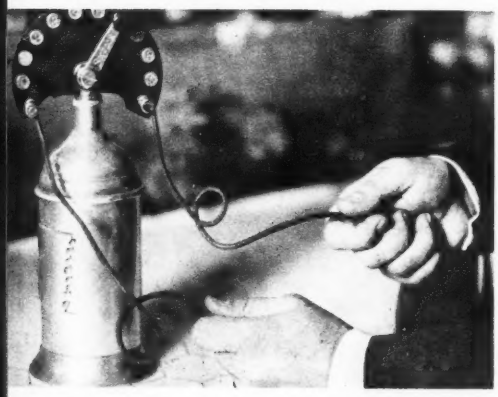
"Rope of life" sent a current of vitality through your body, they said. Made of buttons, sponge and goldfish bowl.

Human horsecollar aimed to magnetize iron in blood, restoring health. Investigators gave it horse laugh!

Users of this device not only saw the light, they were supposed to feel it. Different colors treated special areas.

Baldy cap claimed to grow hair on bare noggins. Electric shock made hair stand up, but scalp stayed nekkid.

For only $90, you too could have taken this colored-light cure—before authorities stepped in, that is.



Enough electricity was supposed to be generated by this contraption to relieve any ailment you might name. It couldn't even get up a spark, though.

The ads claimed these heel plates produced vigor and cured senility by acting as a battery for your body. Officials gave its seller the cure (jail) instead.

Heel Plate Sales Bring Jail Term

A Tennille, man who prosecutors said made a fortune selling heel plates for their alleged therapeutic value today drew a sentence of six months in jail and a fine of $1,000 from Federal Judge Bascom S. Deaver.

He is Walter Gordon convicted by a federal terday afternoon of a vio the pure food and drug ac prosecutors alleg rtised his prod nd by radio th . Witnesses fr ississippi and mong 60 who g the two them claimed by wearing shoes

a lot of money for their promoters. That is, until Federal authorities entered the picture.

We've found that a lot of people who scoff at cure-all claims for pink potions are fair game for unscrupulous promoters of therapeutic contraptions which are ballyhooed with blatant claims. They victimize the weak, the credulous, the ill and the poor. Often their price tag is up around a thousand dollars.

The mechanical heart was one of the devices which was supposed to cure almost every ailment. It consisted of flashlight batteries, a small buzzer coil for sound effects and an attachment for weak electric shocks. It could cure weak eyes, falling hair, broken noses, weak lungs, neuritis and varicose veins. A Federal court seized the gadget but its manufacturers contested the seizure.

The judge who upheld the action said, "The claims made for the devices in the literature accompanying them were as falsely misleading as might be possible by the use of the English language." But don't think our mechanical-heart manufacturers were through.

About five years later they started selling them again under a new name and once more we began legal action to force them off the market.

The desert-air lamp, originally advertised in 1947, consisted of a stand, a reflector and an ordinary electric-heater element. It was alleged to treat sinus, asthma, sacroiliac pain and snoring—until court action led to a change in claims.

About a year ago, phonograph records guaranteed to furnish blissful sleep to the listener were foisted on the public. You heard the voice of an alleged hypnotist who promised sleep "in the most delightful manner." He also claimed he could defer your slumber until a convenient time minutes or hours later. Several shipments were seized and trial is now pending.

Among the newest of the contraptions is a "short wave internal heat treatment" for 70 different illnesses. The ads listed all the diseases it could cure in an orderly alphabetical arrangement—from abscesses to whooping cough. Government charges against the manufacturer listed not only the false and misleading claims, but also danger to health. Authorities agreed that the device could cause burns and other serious injuries.

Then there was a "cosmic light" device, which consisted of a transformer in a box with neon-like tubes on top. This was sold chiefly to chiropractors and physio-therapists [*Continued on page* 159]

Tubeless Tire

Miss Joyce Russo shows you there aren't any leaks in a PSTT even after it's stuck with 6 sharp ice picks.

IF the next time you see your garage man he says, "Pstt!" don't think he's about to tell you a secret. PSTT is B. F. Goodrich's nickname for their new Puncture-Sealing Tubeless Tire, finally perfected (and announced with anything but secrecy) after years of experimental development at their Akron, Ohio, plant.

Lacking the conventional inner tube, PSTT is mounted directly on the rim. The new tire will fit any standard full drop-center rim. Only adaptation required is a special valve stem, designed to fit and seal the rim's regular valve hole; the stem is provided with each tire. Rubber and metal washers prevent air leaks.

Air pressure within the tire itself forces air-sealing beads against the rim. A gummy rubber substance lining the tire makes it puncture-proof. Only if the rim is very badly damaged will PSTT lose any air, says Goodrich. PSTT's price: $24.95. •

After driving the tire over a 10-foot line of 3-inch spikes, Frank Herzegh, who helped perfect the casing, checks the air. Not a pound was lost.

It's eight feet square. But wait until he waves his hand and makes things appear.

Workshop in a Closet

ALFRED Tomlinson couldn't live without that workshop of his! And when he moved into the little house in St. Albans, Long Island, there just wasn't any room for a workshop—none, that is, except a spot about eight feet square in the corner of the cellar.

No, Tomlinson didn't commit suicide. Into that cubbyhole he crammed a three-foot lathe, 24-inch jig saw, eight-inch circular saw, 14-inch drill press on a floor stand, double-ended grinder, five-foot workbench, 30-gallon air tank with a water-cooled compressor, control equipment for radio-operated garage doors, and well over 500 individual hand tools.

By ingenious planning his shop is workable, too, with complete access to all machines. How did he do it? The saw folds under the bench, the lathe and jig disappear into the table top, cabinets cover every inch of wall space, etc. It took him quite a while to dope out his "magic cubicle" but now he's a happy man. •

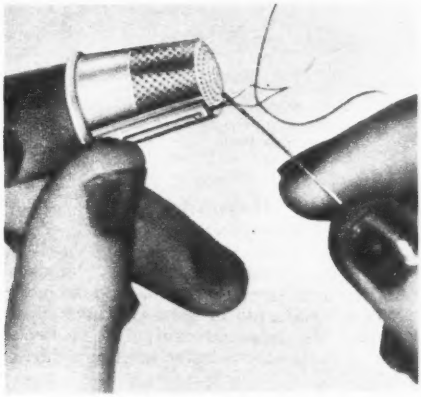
Saw fits under the bench at left (below), drill press is hiding behind door frame.

Jig saw folds down into table. Note intercom unit above vise, and convenient wall drawers.

NEW for the HOME

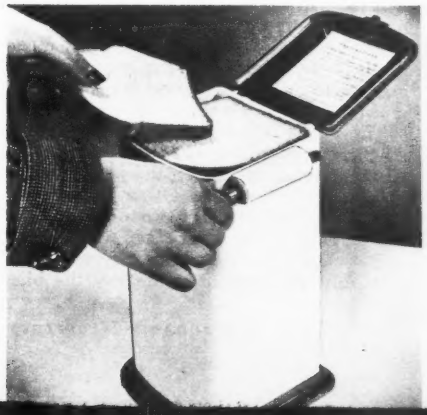
Refriger-Range gives you both heat and cold all in one box. The top is a gas or electric stove and the bottom is an efficient refrigerator. They are separated by triple insulation. Perfect for cubby-hole apartments. General Air Conditioning Corporation, Los Angeles, Cal.

Three-Way Thimble makes sewing an easy job. It's a knife, needle-threader and thimble all in one. A small blade cuts the thread and the threader pulls it through eye of needle. Otherwise it's just an ordinary thimble. Magic Thimble Inc., New York, N. Y.



Bread Butler is a real kitchen helper. It's a dispenser which stores a full loaf of bread and delivers a slice at a time when you turn the knob. Keeps bread fresh for weeks. Ward Philips Company, Box 3451, Merchandise Mart, Chicago, Ill.

Tele-Chairs are a boon to televiewers. They swing completely around on a concealed swivel which allows you to turn in any direction without getting up or moving the chair. Designed by Crown Upholstery Co., Los Angeles, Cal.



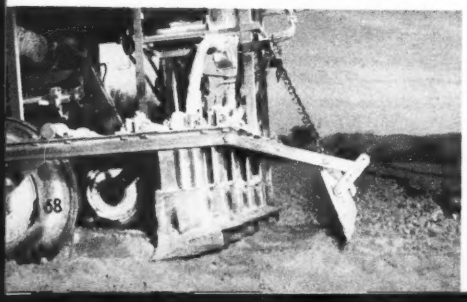
The Ripper is a gadget that attaches to your sewing machine but it doesn't sew; it "unsews." Its sharp edge rips open seams and stitches in a jiffy. La-Wa-Co., Birmingham, Ala.

Soil renovator in action! Fumes are forced into soil and then blade at back of machine seals them into the ground.

Iron Lung for Sick Soil

By Alexander Lake

Scraggly rows to right of line (above) remained untreated while thick field to left got the Woods treatment. Note metal shoes, below, which blast fumes.



FOR the second year in a row, black scab claimed the entire potato crop of George Woods, California farmer. He put his arm around his wife and said: "We're broke. The soil's just too infested to grow a darned thing!"

Mrs. Woods wouldn't give up, though. "We fumigated the house," she said, "so why can't we fumigate the soil?"

George Woods decided to give it a try. He built a machine from pieces of hose, rain pipe, milk cans and bits of discarded farm machinery. He put a hopper on top and built a gas burner into a metal shoe which was to be dragged through the soil. Into the hopper he placed a mixture of all the poisons he could lay his hands on. Then Woods hitched the machine to a small tractor, opened the hopper, lighted the gas burner and took off across the field.

The fumes almost choked him and the machine kept falling apart. But he repaired it and carried on. When the job was done, he told his wife: "It's either kill or cure. For all we know, the soil might be contaminated forever after this."

But results were fantastically successful. Not only did the fumes destroy the black

This land was once abandoned to alkali and soil pests! Then along came Woods and now this year's carrot crop is so good that there aren't enough culls left in the field to feed one cow.

scab, but Woods actually replanted the scab-infested potatoes and they produced a wholesome, profitable crop.

All this happened 25 years ago. And it brought his career as a potato farmer to an end for Woods interested a chemist in the machine and they spent the next 24 years developing and improving it. Finally, it was perfected and patented under the name of the Woods Soil Renovator.

Today Woods' machine is a combination sub-soiler and chemical factory which makes 100 per cent kills of such soil pests as nematodes, wire worms, garden centipedes, white grubs and cut worms. It destroys all soil fungi and neutralizes the toxic salts in alkali land. The machine kills weed seeds and almost completely eliminates Bermuda grass and wild morning glory. Any desired combination of nutrients may be added to the soil by the renovator.

One attachment enables it to treat irrigation water and add plant foods to it. Another attachment goes into gopher and mole burrows and wipes out such rodent population in short order. The machine is also used for gassing growing plants instead of dusting and spraying.

Woods' tests of his soil renovator are not the haphazard experiments of a starry-eyed inventor. For ten years he has been making demonstrations on soil abandoned because of insect, bacteria pests or alkali. In all of the tests, a strip, 30 feet wide is left untreated in the center of each field. This check strip invariably remains a barren waste while the treated portions on each side bear luxurious crops.

The potentialities of Woods' renovator are tremendous. In the United States, insects and fungi destroy about 20 per cent of all soil-grown crops. Last year, insects alone cost the American grower three billion dollars and fungi cost him another three billion. Add that six billion dollars to the American food bill and it means that every family spent $250 to feed insects and maintain fungi! Woods says his machine can eliminate most of that loss.

The cost per acre? If a farmer were to use all the various methods for destroying soil pests and increasing productivity it would cost him about $250 an acre. And results would be problematical. Woods' machine does it all for less than a quarter of that cost. And results are near perfect.

Fantastic, you say? "The only thing fantastic about it," Woods insists, "is the fact that the machine wasn't invented 50 years ago!" •

A MONEY-MAKING

idea

Fire-wagon artist William Low puts finishing touch on ancient model designed in his basement.

I Build Fire Engines in My Cellar

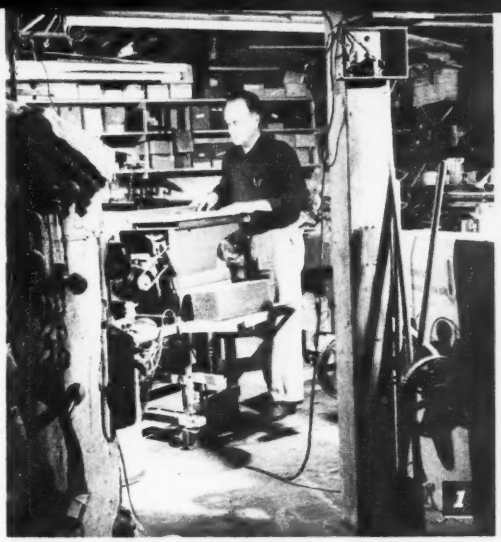
By William H. Low

IT was a four-alarm fire and I couldn't resist the temptation of taking time out to watch it. My favorite hangout had always been the firehouse and for many years I'd been building model fire engines.

As I watched hundreds of people rushing up to see the fire on this day in 1946, I got a bright idea. "If people are so fascinated by fires and fire engines, why won't they buy *model* fire engines to further that interest?" And that's how I got started in my business.

A lot of people, including my former boss, thought I was crazy when I definitely decided to make a full-time job of building and selling hobby kits. I suspect they felt that way because most people are convinced that you can't earn a living and enjoy yourself at the same time. Which is exactly what I do.

From my experience, I'm convinced that anybody who likes to work with tools, enjoys making things and takes pride in what he makes, can earn a living from a creative hobby. *Everybody* likes to make things, but not everybody has



1 Cellar serves as a slightly cramped but adequate workshop for Low's production line.

2 Put those carefully-designed parts together and you've got a complete fire-engine boiler.

3 Simple racks contain thousands of engine parts which are easily assembled in kits.

4 Top shelf holds unassembled kits and on two lower shelves are Low's finished models.

the skill, the know-how or the confidence.

I can prove that by the hundreds of letters I've received from all over the country —from 13-year-old boys to old, retired fire chiefs. But the ones which give me the biggest thrill are from women who write: "I love to make things but I'm not very good with tools. If you think I could make models of old-time fire engines with your kits, I'd like to order a couple." They *can* build 'em and they usually do!

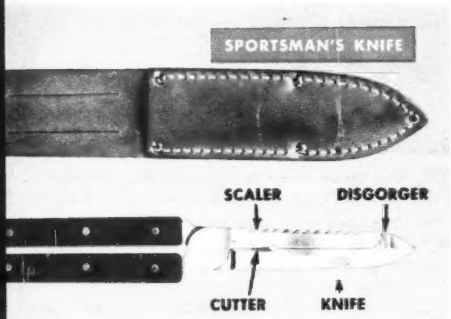
When I first started, I made at least seven models of each engine to determine the best way to box them knocked down. You've got to keep this in mind when you're selling models: if you've got too many pieces, the average person will run into difficulty and never finish it—and you lose a resale. On the other hand, if there aren't enough pieces, it looks too easy and your customers feel cheated. I've found that an average of 75 pieces is best, though I have some with as few as 50 and as many as 130.

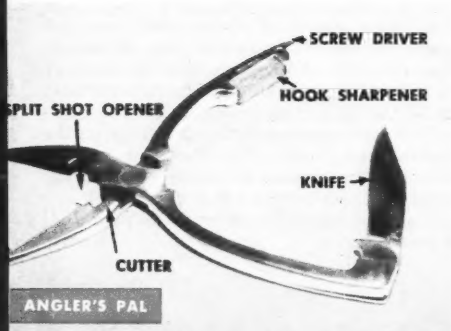
The same applies to the drawings on the instruction sheet. I've found it best to simplify the diagrams to keep overlapping lines on cross-sections to a minimum.

You can start a [*Continued on page* 163]

New Gadgets for More Fish

Frank Taggart, MI's Art Editor, as he models the "new look" for this year's fishermen.





FISHING gadgets are big business! In 1948 approximately $1,350,000,000 was spent by the disciples of Ike Walton in quest of their finney friends . . . and that's a lot of dough.

This season a new crop of gadgets has appeared to tempt your wallet. They're tricky and good. MI's editors have rounded up some of the best for your perusal. They're shown in the picture on the next page.

1. *Litentuf* boots by Goodrich with inside harness to keep them from slipping. Anglers Roost, New York City. $11.95
2. *Invisible Hat* . . . invisible to fish, anyway, because it's colored a light blue to blend with the sky. Abercrombie and Fitch, New York City. $3.50
3. *Fisherman's Vest,* lightweight, water-repellent, with lots of pockets. Drybak, Binghamton, New York. $3.50
4. *Headnet,* modeled in photo at top of previous page, will keep away the flies and mosquitoes. Handy Mfg. Co., Inc., Worcester, Mass. $1.00
5. *Canvas Creel* has slot in top for insert-

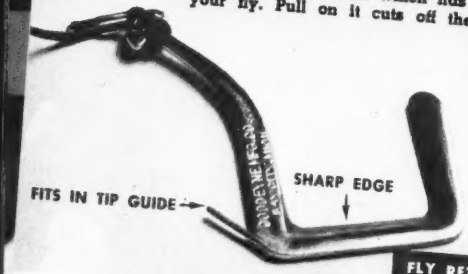
For description of these items, see text.

ing fish, and carries a built-in ruler. Collif Mfg., Taunton, Mass. $3.95

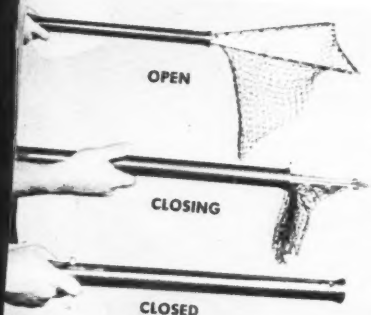
6. *Plastic Minnow Trap* folds up and fits in the bottom of your tackle box. Hamel Co., Rochester, N. Y. $4.50
7. *Bait Belt Box* holds either worms or flies and clips on your belt. Handy Products Co., Benton Harbor, Mich. $1.00
8. *Auto Net* is carried in a metal tube. Press a button and it pops open. You won't snag this one on bushes! Stanley Auto-Net, P. O. Box 452, Paradise, Cal. $6.65
9. *Sportsman's Knife* is also a leader cutter, hook disgorger, fish scaler, pliers, sinker crimper. Conboy Craftsman, Inc., Utica, N. Y. $3.98
10. *Fly Fisherman* is a knife designed especially for the task. It carries tweezers, scissors, awl . . . everything the fly fisherman might need. Abercrombie and Fitch, N. Y. C. $15.00

New casting reel at right features magnets which build up magnetic field in the line-carrying spool when it spins, acting as a brake and eliminating backlash. Made by the Horton Mfg. Co., Bristol, Conn. $26.40

This gadget fits in the rod tip and hooks over the tree branch which has snagged your fly. Pull on it cuts off the branch.

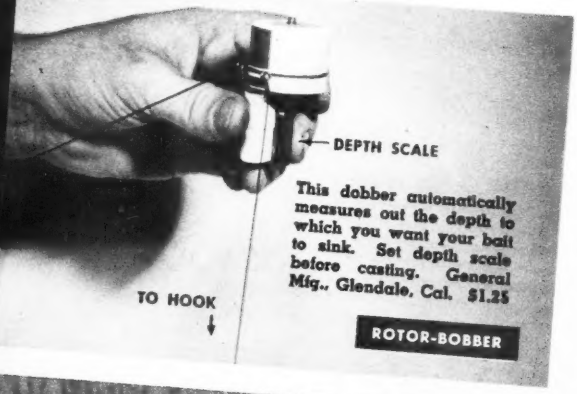


FLY RETRIEVER



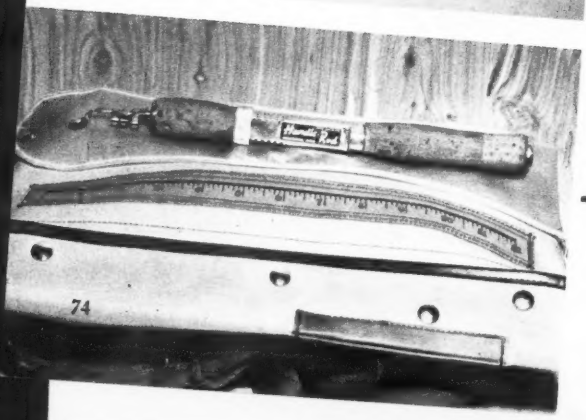
Pulling back on a knurled screw retrieves the Auto-Net into its tube. Pressure on the screw lets it snap open.

AUTO-NET



This dobber automatically measures out the depth to which you want your bait to sink. Set depth scale before casting. General Mfg., Glendale, Cal. $1.25

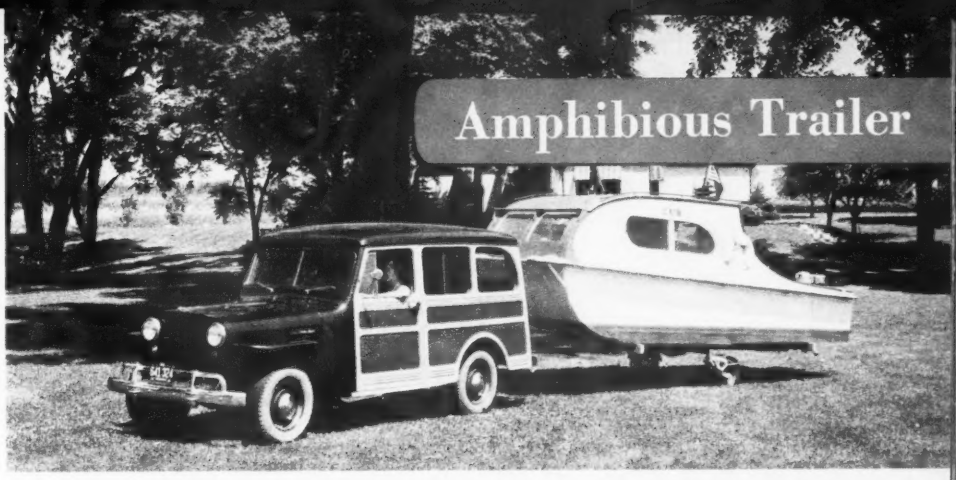
ROTOR-BOBBER



Here is the Handle-Rod collapsed to 11 inches, as shown by the ruler on the canvas creel. It can fit right inside.

11. *Retriev-a Buoy* fastens to the butt of your rod. When dropped in deep water, a buoy is released; haul it up and your rod, too. Panef Mfg. Co., Milwaukee, Wisc. $2.95
12. *Angler's Pal* is a combination knife, pliers, sinker splitter, screw driver, hook hone, disgorger, leader cutter. P. O. B. 1291, Long Beach, Cal. $5.95
13. *Presto Oiler* is a pocket oil container which clips on like a fountain pen. Use it for oiling reels. Dill Mfg. Co., Cleveland, Ohio. $1.25
14. *Mitchell Spinning Reel* is the best of its type yet produced. It comes with 2 spools; the larger holds 510 yards of 4-lb. test monofilament line. Special knob locks reel for netting fish although adjustable drag still works. Chas. Garcia and Co., New York City. $28.75
15. *Handle-Rod* is 5 feet long, telescopes to 11 inches. Made of non-corrosive beryllium copper, has excellent action. Champion Products Co., Muskegon, Mich. $13.50
16. *Telescoping handle* takes gaff hook [*Continued on page* 166]

Amphibious Trailer



On land or water this outboard cruiser provides comfortable sleeping quarters for week-end sailors.

FOR less than $1,000 you can own a houseboat on wheels. Powered by an outboard motor, the "Cub" has an open cockpit which can handle two people and a closed cabin for a couple more. You can pull it to the waterfront of your own choice on a two-wheeled boat trailer. Then just back it into the water where it'll float off smoothly. This dreamboat-of-a-sort is 15 feet long and weighs 750 pounds. •

Painter With Wool

Wool-artist MacDonald displays two of his "paintings" which appear similar to oils.

It takes three hours to cover two inches of canvas and four months to do a picture.

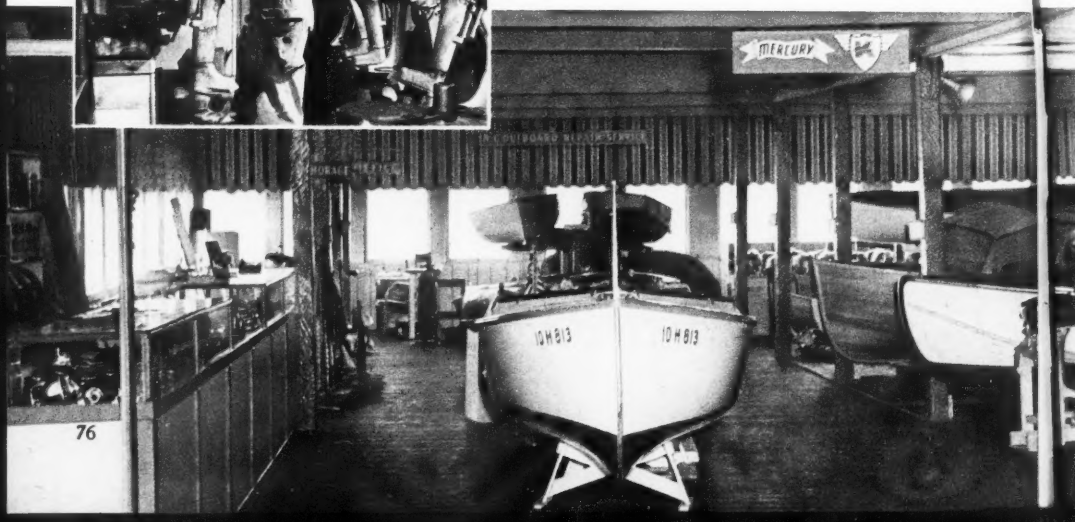
WHILE thumbing through his wife's magazines, Charles MacDonald got the idea for his unique hobby. "If women can make designs with needle and thread, why can't I paint pictures with needle and wool?" Since then, he has produced works which are highly regarded in both needlework and art circles. MacDonald claims he's America's only painter with wool. •

Photos by Lee Choplin

Dealer In Dreamboats

Cochran, top left, steers a customer to an ideal boat bargain. Left, clinic for ailing outboards.

Showcases, shelves and office in Cochran's de luxe display hall, below, were built out of dish crates.



By Charles Samuels

ONE day last summer, a stranger walked into Cochran's Marine Showroom, at City Island, a fishing and boating center in Long Island Sound off the Bronx, and slapped seven $100 bills on the counter.

"I wanna $700 boat," he said.

Ralph Cochran, the 33-year-old proprietor, explained that he had several good models in that price range.

"Do you prefer a fishing boat, a family boat or are you primarily interested in speed?"

"Skip the sales talk, buster," said the stranger. "As long as she runs and costs about 700 bucks, I don't care what kind I buy."

Cochran studied the man's bloodshot eyes.

"But I care what kind of boat I sell you," Cochran said firmly."

"Why should you?" exploded the stranger. "Ain't my money good?"

"Not at the moment—because you've been drinking. You probably don't know what you're doing."

The would-be boat buyer screamed and blew his top. After shooting off steam for a few moments, though, he finally let Cochran take him out for some black coffee. A half hour later, when he had sobered up, he listened attentively to Cochran's description of several $700 boats. Then the big-cash customer bought a 14-footer with a 10-hp motor that Cochran assured him would prove ideal for fishing.

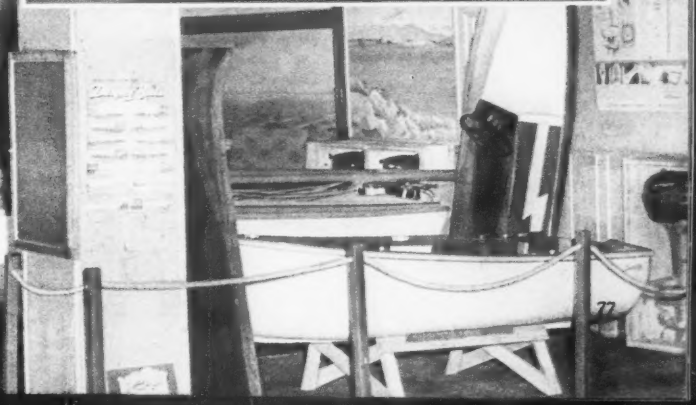
"I'd be a sucker to sell a job costing that much to a man who is stewed," Cochran said later. "Suppose he got one that he was unhappy with later on? After all, my customers are my best salesmen and press agents."

Through such unorthodox sales tactics, plus showmanship, luck in the clutches and hard work, Cochran in the past two years has parlayed his $331 starting capital into a $100,000 boat business.

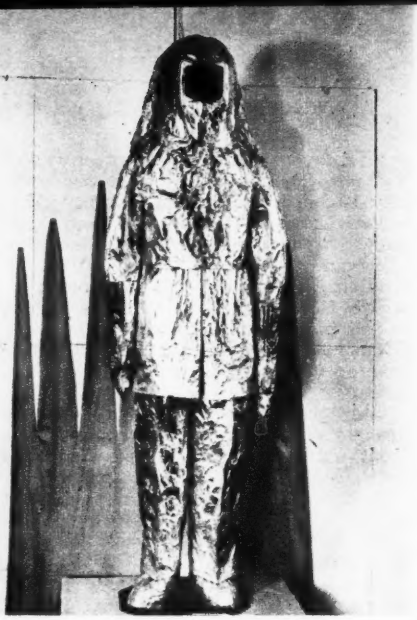
Ralph Cochran, a rangy, outspoken fellow, knew plenty about small boats, but practically nothing about bookkeeping or salesmanship when he opened his Marine Showroom. Born and raised on City Island, he had worked in the local boatyards ever since he was 15. Before taking the big jump on his small bankroll, he'd spent several years as repairs foreman at the H. B. Lee Shipyard.

One snowy night in January, 1947, Cochran came home to find Ray Parlato, a friend of the family, waiting for him. Parlato said he'd bought a long-vacant one-story building that had once housed a nightclub. He wanted [*Continued on page* 154]

A nightclub once staged floor shows in the big one-story building that now features motorboats and hamburgers.



Canned Life is what scientists call this cannister-mask which conserves body heat and moisture usually lost through normal breathing. Navy is experimenting with it for cold climates.

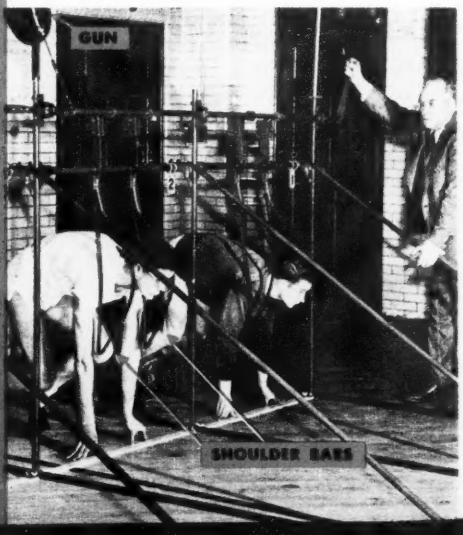


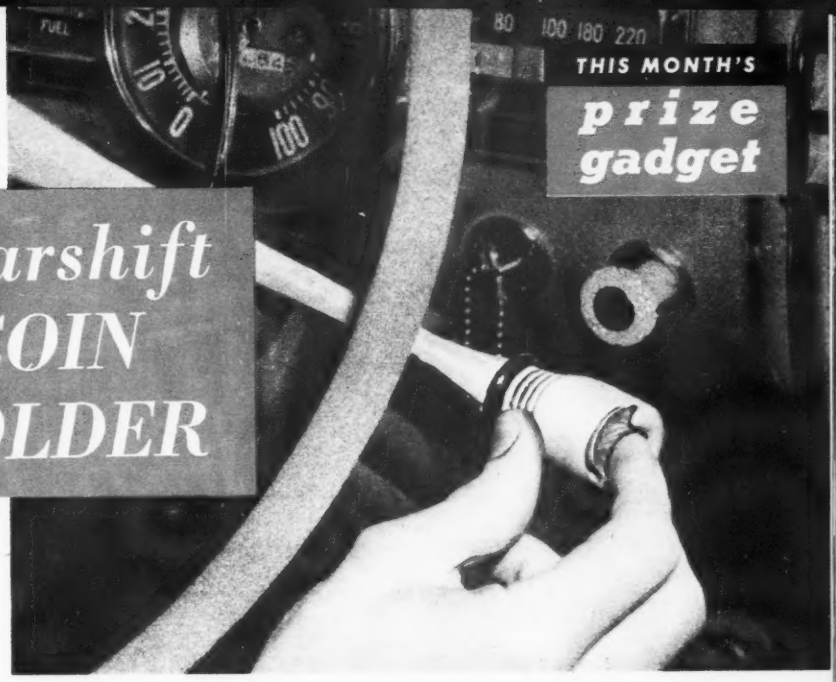
Hot Suit for cool air-crash fire fighting has been developed by the Army. Three-pound suit is made of aluminum foil laminated to cotton backing. It reflects flames and gives wearer utmost protection.

NEW in SCIENCE

Lightweight Motor is a bicycle power unit which sells for less than $90. It'll get more than 125 miles to a gallon, too. Buzz-Bee Corporation, 221 N. La Salle Street, Chicago, Ill.

Ready! Get Set . . . Automatic starter gives runners the gate with no false starts. When inventor Ben Ogden of Temple University pulls the lever, the gun goes off and athletes' shoulders lift bars





THIS MONTH'S **prize gadget**

Gearshift COIN HOLDER

WIN $50

Dreamed up a neat gadget? If you're pretty keen about that pet project of yours, get busy and work it out in your shop. Then send pictures and a description of your invention to the Gadget Editor, Mechanix Illustrated, 67 West 44th Street, New York 18, N. Y. Each month the best entry, in the opinion of MI's editors, will be awarded a cash prize of $50.

THE burly cop on the icy sidewalk gave Joe Goodhue a look that made him squirm. Joe, a 34-year-old restaurant operator in Leominster, Mass., had just slid his car to a stop before a parking meter but couldn't find a coin. He fumbled through all his pockets, ransacked the glove compartment, even yanked up the back seat. The cop stared harder. Finally, feeling like a kid caught snitching pennies off the newsstand, Joe stopped scrambling for change and backed away.

That embarrassing moment in 1947 started Joe on another search—for a gadget that would keep coins always handy for meters, toll fares and fast phone calls. In his home workshop he invented a plastic coin holder that screws on to the gearshift lever and puts change up to a quarter right at your fingertips. For making life a little easier for the harried motorist, MI's digging up $50 in a hurry to keep Inventor Goodhue loaded with change for his "Coin-Quick" prize gadget. •

Goodhue puts a finishing touch on the test models for the gearshift coin holder that he developed in his workshop.

Across the trestle goes Old 1468, Connecticut trolley of 1905 vintage. Replica of the car built for the King of Siam in 1904 is scene of BERA bull session, above.

Streetcar Named Retire

Photos by Alfred Eris

Here's the nostalgic story of a group that maintains an Old Folks Home for over-age trolley cars.

By Alfred Eris

WHERE do good trolleys go when they die? Why, to Branford, Conn., of course, where they're completely rejuvenated so they can keep on jolting along forever.

Just a few miles outside of New Haven, the Branford Electric Railway Association maintains the only operating trolley museum in the world. BERA boasts 35 streetcars which roll

along 3½ miles of track. Sharing in the fun are 1000 members—some from as far off as California and Alaska. About 40 per cent of the trolleys are donated by streetcar companies which recognize BERA's true love.

The first thing the organization does is assign a fan to a particular trolley. Under such loving treatment, the streetcar is put into first-rate operating condition and made as trim as it was the day the factory set it loose on the tracks. After a few weeks, the trolley is ready to parade proudly up and down the right-of-way.

Recently, a group of New York fans decided they had to have some representative Third Avenue cars. The president of the company agreed to allow BERA to adopt three of his brood. Then, the thorny problem of transportation arose. It was finally solved, however, by a combination of barges, railroad flat cars and specially-built ramps.

Members still beam when they tell of the Kansas City enthusiast who celebrated his wife's birthday in an unusual manner. He leased a streetcar and took her on a 32-mile, three-hour ride around the city! •

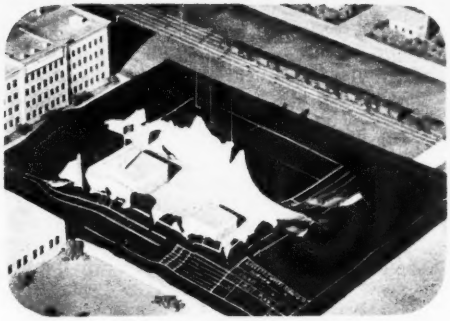
Rejuvenating old cars is the joy of BERA members, above. Motorman hobbyist, below, gets indignant when cattle block track.

Haven for clang-clangs. This is where more than 35 streetcars named Retire, have done just that.

MEET the guy who's making a fortune teaching chimneys to act. He's Ben Harrison, producer of those amazing animated television commercials.

When you see a bunch of happy packs of Chesterfields marching around on your video screen, you're seeing a difficult job superbly done. For a "simple" one-minute, animated commercial has 1440 frames and takes about four months of precision labor to produce. Every action requires a revised model and countless scale props.

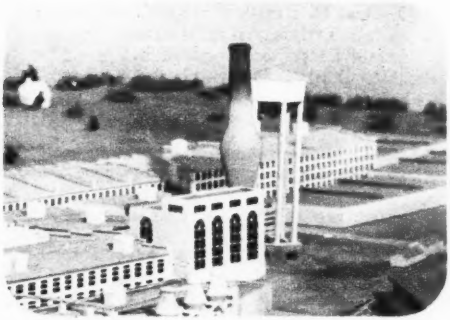
So, if you run across an extroverted chimney at your television set some night, it was probably Harrison, the stop-motion man, who breathed life into it. •



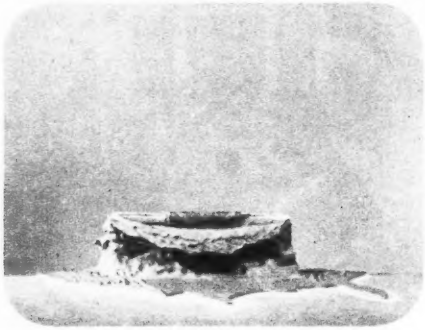
New Chesterfield factory starts to spring up out of a blueprint lot in Harrison's latest commercial.

STOP-MOTION MOVIES

Three-dimensional factories bulging with activity are prepared by Ben Harrison.



As more people buy Chesterfields (so the commercial says) the chimneys must huff and puff . . .



Here comes a package of Chesterfields bursting triumphantly through Harrison's map of America!

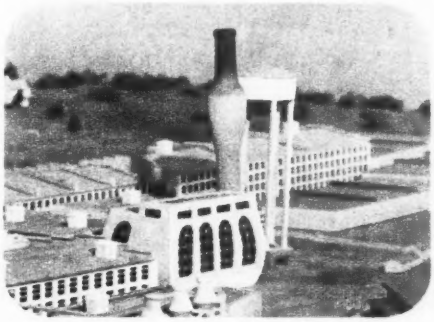
Little by little the giant pack emerges from the center of the relief map until it is finally clear.

Gradually it grows out of the ground, a perfect replica of the actual building in Durham, N. C.

But here's how it's really done. Harrison, left, steadies building as helper pushes under table.

New Technique for TV

Photos by Leo Choplin



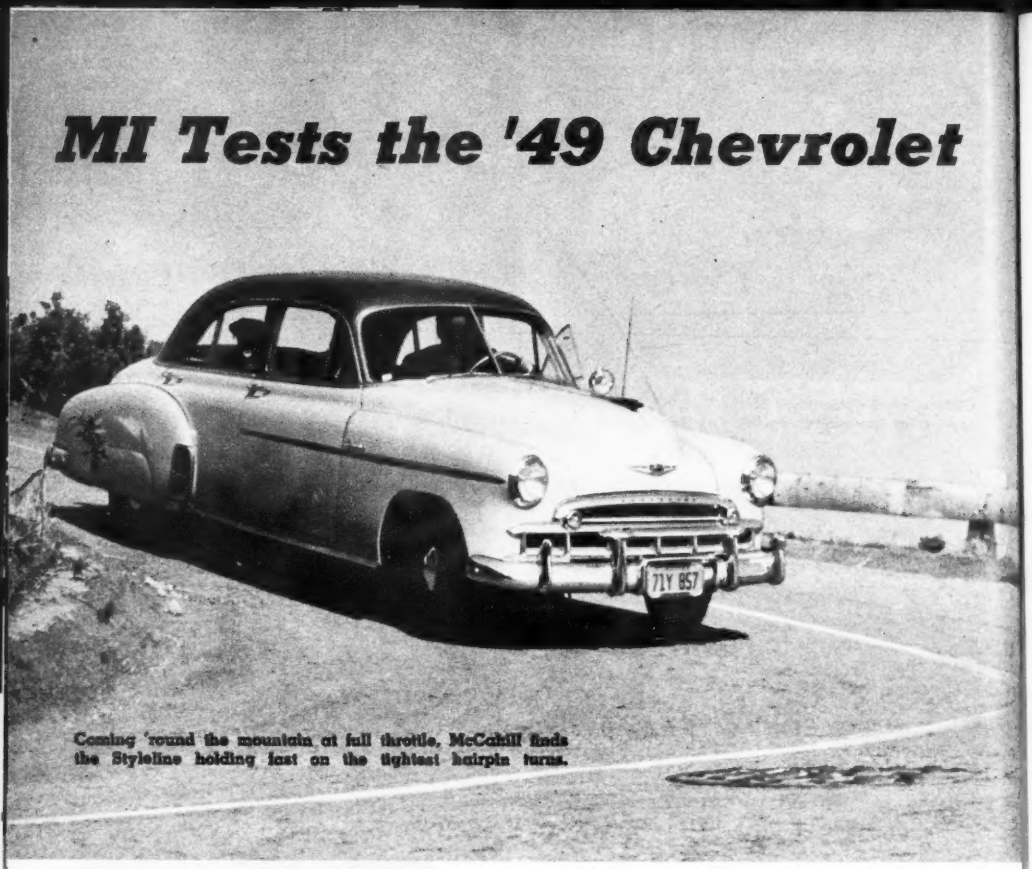
. . . and the factories must bustle and bulge with activity in a frantic (but efficient) rush to turn out . . .

. . . smokes for a nicotine-mad populace which (so the commercial says) always buys Chesterfields.

Then in a burst of music, the televiewer sees the whole package just risen from the heart of America!

It takes plenty of jack on the part of Harrison's assistant to raise the giant pack in the studio.

MI Tests the '49 Chevrolet



Coming 'round the mountain at full throttle, McCahill finds the Styleline holding fast on the tightest hairpin turns.

Tom and his dog study pot-bellied door that fits into the sedan's rear fender.

By Tom McCahill

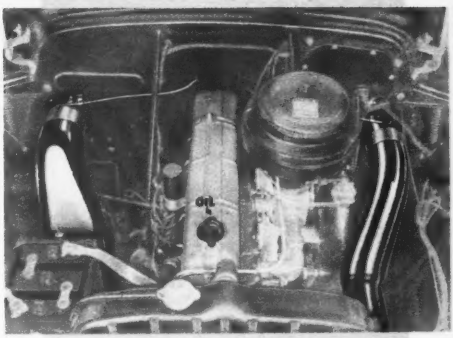
THE new 1949 Chevrolet has been sexed up quite a bit. It's not dazzling enough, though, to cause the boys at the firehouse to fall off their chairs in a swoon every time one passes their door. It's wider and more comfortable than any Chevvy ever built before but the change hasn't been as complete a divorce from old models as that made by its closest competitor.

The Chevrolet is America's No. 1 family car and has held that top spot for many years. It is functional, reasonably tough and as utilitarian as a spittoon. More guys go to work and, for the most part, return home each day in Chevrolets than in any other car in the world. For many a farmer or salesman, the Chevrolet is as essential to his daily life as his pants. Millions of little Willies and Marys are driven to school in these cars and millions of pounds of groceries are lugged home in them to keep the family fed.

Henry Ford dropped into second place many years ago with Mr. Average American. Chevrolet began turning out cars faster than Ford and so had more to sell—and did. Year after year, Chevrolet has successfully matched the competition with a sound, solid offering. It has never been outstandingly superior but, on the other hand, has never been inferior except once, many years ago, when the air-cooled Chevrolet was introduced. Mere mention of this 24-carat, gold-plated little stinker will still bring splotches of red to old Chevrolet men's cheeks. Oddly enough, the only air-cooled Chevrolet known to the writer to be still in existence is in the Ford museum at Dearborn—and that prize number can't be bought for a king's ransom.

With proper care, a Chevrolet will last about the lifetime of a horse. However, as my horsey readers are limited, I'll approach it from another angle. The Chevrolet is the best low-priced car built in America, bar none, from the standpoint of reliability and service—provided you recognize its limitations. These limitations boil down to only one weakness: the Chevvy doesn't stand up well under excessive, high-speed driving.

The Chevrolet is an extremely fast car, considering its 90-hp engine. It has good pickup in all [*Continued on page* 142]



New under the '49 Chevrolet's hood are two air vents, oil filler atop engine.

Pushbutton door is another innovation on the Chevvy. Handle doesn't move.

Tom pauses above the Pacific between tests. Note the windshield—it's curved and bigger.

Duke Nalon, McCahill's choice as this year's winner in Winfield's Novi No. 54, gets the checkered flag at the '48 race.

Winfield Will Win at

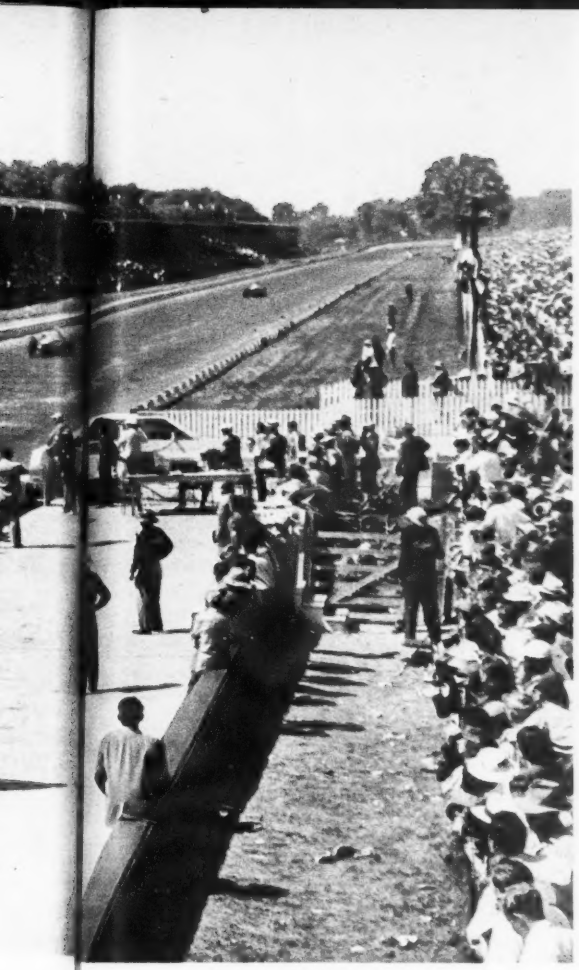
MI's clairvoyant auto expert, Tom McCahill, grabbed his crystal ball and toured the homes of America's top racing cars. Here are his predictions—and he dares you to check 'em against results!

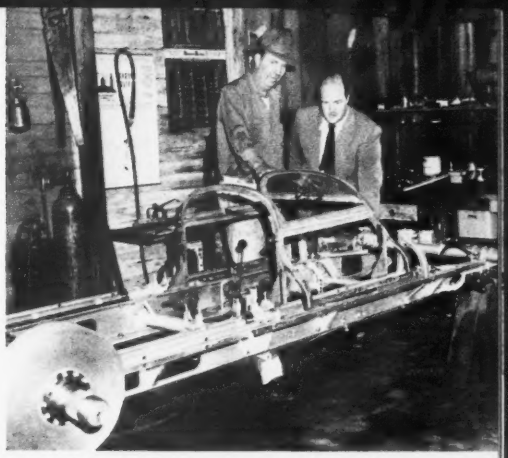
Bud Winfield, owner of the Novi Governors, is going to win the 1949 Indianapolis race with Duke Nalon at the wheel. Lou Moore, owner of the first and second cars to finish in '47 and '48, will have to settle for second money this year.

WHY am I sticking my neck out like the antler on a moose head? Here's how it happened.

"Tom, find out who's going to win the '49 Indianapolis Race," the editor said, not daring to look me squarely in the eye as he spoke, "and write us an article about it."

"Sure," I said, unclenching my fist as I





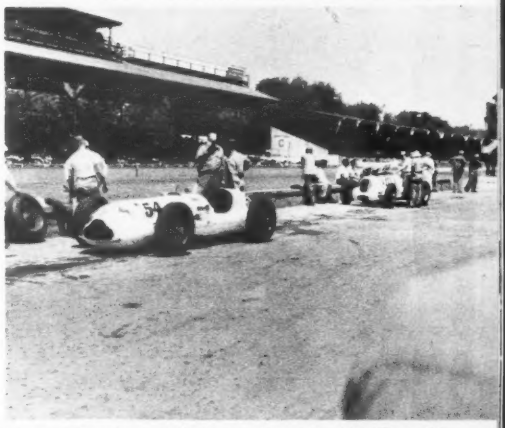
Swami McCahill looks over the skeleton chassis of one of the Novis with Bud Winfield. Believe it or not, in a couple of hours this car was all assembled.

McCAHILL'S WINNING TEAM: left to right are Jean Marcenac, mechanic; Duke Nalon, driver; Bud Winfield, designer and owner; and Leadfoot Mays, another driver. That's the great prognosticator himself in back.

Indianapolis!

quickly remembered which side of the bread my butter was on. For it's just as easy to predict the outcome of an Indianapolis race as it is to find ten-dollar bills on Times Square. It's like predicting that a new-foaled thoroughbred will win the Kentucky Derby. Hundreds of factors must be considered. Even the 10-mile qualifying race, which all cars must make, is a tremendous hurdle these days. There's room for only 33 cars and the fastest 33 are in.

I've spent the last few weeks visiting the plants which turn out nearly all American race cars. I talked to drivers, designers and builders and I [*Continued on page* 134]



Here's Winfield and Nalon in the pit in '48. Their 54 might have won had it not been for faulty refueling.

FRANK TINSLEY '49

New York to California in MINUS 3 Hours

World's first Atomic Airliner, previewed here by MI from plans under way for nuclear craft, may fly "forever" at 10,000 mph.

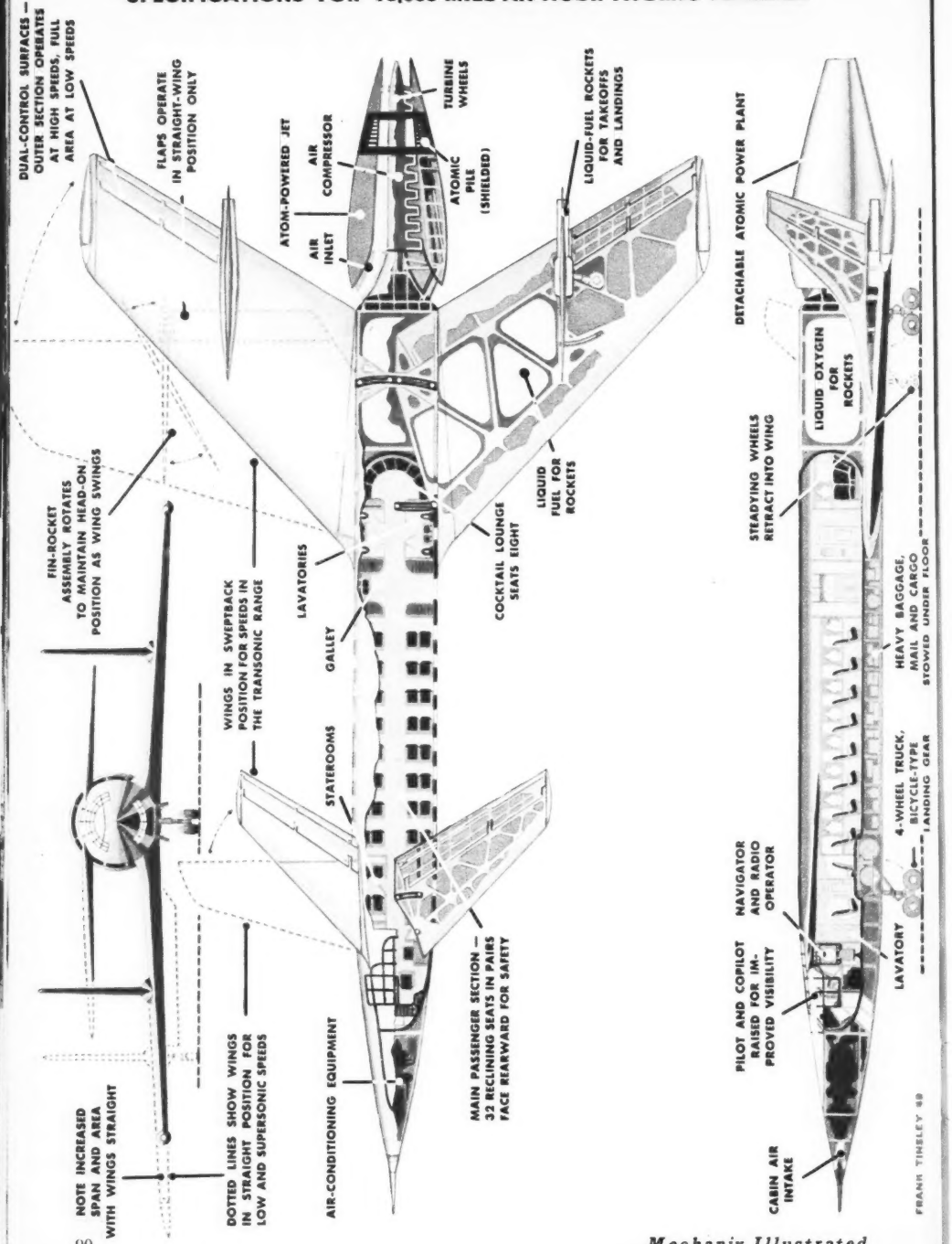
By Frank Tinsley

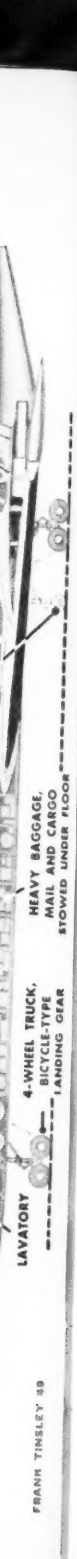
TOMORROW'S Atomic Airliner will easily shatter the 5000 mph-speed record for today's two-stage rocket, the "Wac Corporal." The liner could take off from New York at noon and flash into Los Angeles at 9 a. m. the same day—*three hours before it started!*

By flashing through time zones from Eastern Daylight to Pacific Standard, the Atomic Airliner would have no trouble gaining three hours on the clock. That would include 40 minutes for a relatively slow climb to, and descent from, high altitude and a shade more than 15 minutes for actual cruising time at 10,000 mph.

But even this terrific speed would not be the absolute maximum for the atom-powered plane. Such a craft might fly 12,000, 15,000, 18,000 mph—or even [*Continued on page* 91]

SPECIFICATIONS FOR 10,000-MILE-AN-HOUR ATOMIC AIRLINER





faster. Despite the subzero cold at 60,000 feet, where normally the super airliner will fly, a new refrigerating system for planes will be needed to keep friction with the rarefied air from melting the hull as the ship streaks through the stratosphere. With an atomic engine, top speed would be limited only by the practical considerations of the plane's structural strength and the airline's flight schedules.

Not only will the Atomic Airliner have virtually no top speed but, theoretically at least, it will have unlimited range. Recently an Air Force B-50, Lucky Lady II, made a sensational nonstop flight around the world. Though Lucky Lady flew more than 23,000 miles before coming down to earth again at Fort Worth, Texas, 94 hours after takeoff, the globe-girdling bomber had to be refueled four times in the air by special B-29 tankers to make that distance. Once aloft, the Atomic Airliner would never run low on fuel and could streak around the world in some two hours—then just keep on flying practically forever, or until its crew literally dropped dead of old age.

Study of the latest reports available from the nuclear-fission experimental labs indicates that the atom-powered plane with such fantastic speed and unlimited range has flown out of the dream world and is actually in sight. According to David M. Poole, an Oak Ridge scientist, the atom aircraft is already beyond the theoretical stage and it's now up to the engineers to draft specifications and build working models.

"The time has come," Mr. Poole says, "when we can no longer afford *not* to have atomic aircraft."

To give MI's readers an exclusive preview of this revolutionary new plane, the author has studied the latest information available from the nuclear scientists and drawn on his own knowledge of advanced air design to picture on these pages the world's first Atomic Airliner.

Undoubtedly, the first nuclear aircraft will be military. The speed potential and unlimited range of atomic power makes it a logical vehicle for the delivery of its deadly sister, the atomic bomb. Then, after Air Force pioneering has eliminated the inevitable bugs, next will come a limited number of official atom-powered transports, followed in short order by the first Atomic Airliner. We use the word "limited" advisedly because of the enormous cost of the atomic fuel and reactor and because its very efficiency will place a cast-iron limit on the number of machines required to handle the traffic. Until some new, basic discovery lowers atomic-power costs drastically, the airliner will be used primarily for super-speed, emergency service—at super-high rates.

Size and seating capacity of MI's atom express will depend on the weight of the shielding necessary to protect the plane's crew and passengers from the powerplant's deadly radiation. Most estimates now put the gross weight of the projected atomic aircraft at 70 tons—about the same size as the B-36 bomber. If current experiments with lighter shields prove successful, though, our new plane may weigh no more than the B-47, Boeing's 62-ton jet bomber.

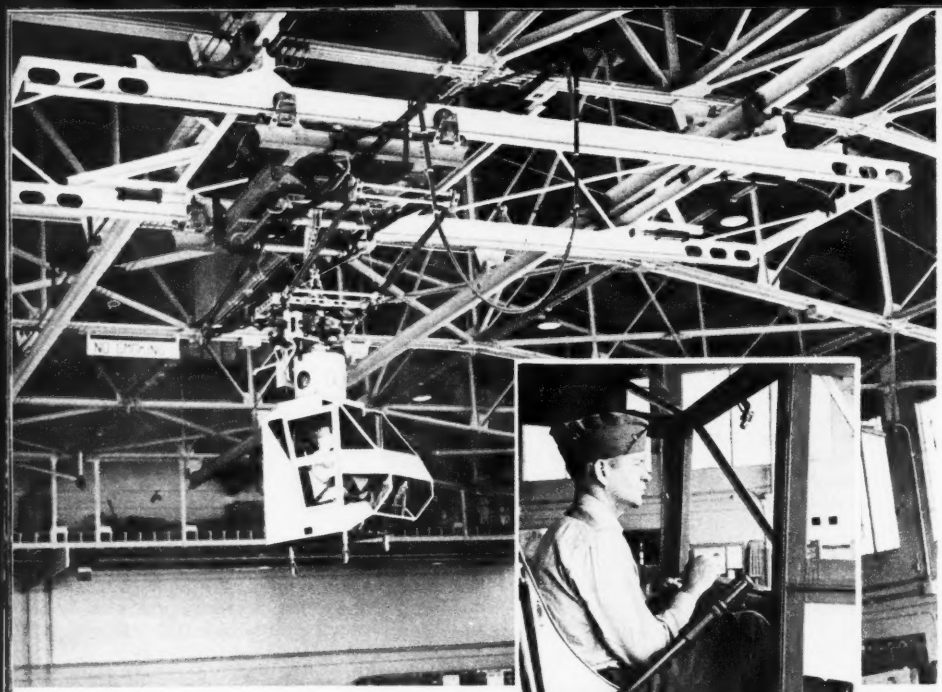
On the basis of completed research, Dr. Andrew Kalitinsky, head man of the Nuclear Energy for Propulsion of Aircraft project at Fairchild Laboratories, New York, says that the atomic engine, the reactor and the shielding for the plane will weigh about the same as the engines, fuel load and tanks of our present big planes—and therefore will call for a large airframe.

The design of the airframe must be adapted to the particular type powerplant developed for the plane. In a recent progress report, Dr. Kalitinsky includes steam turbines, turbo-jets, ram-jets and hydrogen rockets in his outline of the basic forms of powerplant for utilizing atomic energy in aircraft. The most practical of these engines at present, the atom-powered turbojet, is used in the design of MI's Atomic Airliner. A nuclear reactor girdling the combustion chamber like a belt will take the place of conventional fuel and heat the air "fuel" for the jet.

The big problem in designing an atom-propelled plane is just how to seal off the "hot" rays radiating from the atomic pile. Even a giant plane could never lift massive, concrete shields like those surrounding the stationary piles at Hanford, Oak Ridge and Brookhaven.

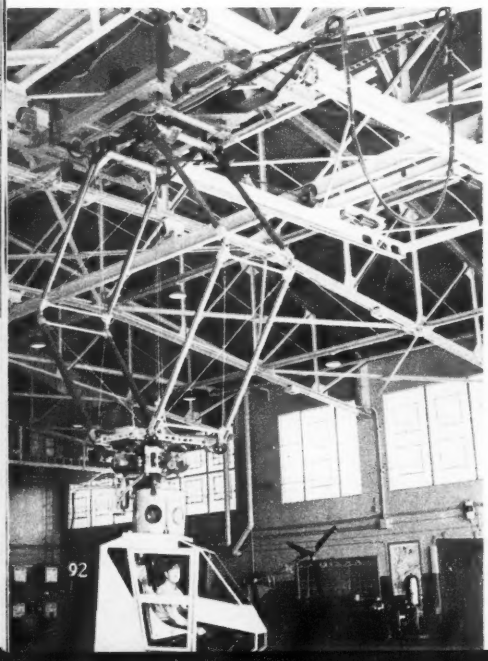
Intensive research now under way may soon solve this shielding problem. The most lethal radiations are the neutrons and gamma rays. Layers of a material such as graphite can reflect the neutrons without any absorption. On the other hand, only a dense material like lead can slow up or absorb gamma rays.

"A material that is good for stopping gamma rays," says Dr. Kalitinsky, "may not be the best when gamma rays and neutrons are considered together. And a material that is good for the innermost part of the shield may not be the best for the outer layers. Consequently, there is considerable room for weight reduction by ingenious design." [*Continued on page* 161]



Soaring around the hangar in the trainer, Lt. Comdr. Waldron, an air pilot, quickly learns how to fly a helicopter. Right, closeup of cab in normal flight.

Trainer for Helicopter Pilots



NOTHING looks simpler to fly than a helicopter hovering motionless over a landing strip like a giant hummingbird. But despite the progress since that inventive genius, Leonardo da Vinci, sketched the idea for a helicopter over 400 years ago, it is still the most complicated aircraft to pilot and must be constantly jockeyed to keep it on an even keel.

To help its aviators master these difficulties and learn vertical flight in safety, the Coast Guard set up an electric "flying-windmill" trainer in its hangar at Floyd Bennett Field, N. Y. The trainer maneuvers just like an egg beater and can "fly" 100 feet forward or backward and 50 feet up and down or to either side. Controls are similar to those in a Sikorsky training helicopter, with the addition of a horn and red light to warn the student if he lets the tail rotor drop too low—a mistake that might kill him in landing a real helicopter. •

Scissor joint above the cab closes or opens up to simulate 'copter's vertical takeoffs and landings.

Boullet, left, shows an aide how to blow smoke so that the witches' pot will "boil."

shadow ballet

IT'S an old Chinese custom to watch shadow puppets dance across a white screen. Soon it'll be a new Paris fashion, too, if Artist Jean Boullet has his way. Recently he opened the shadow theater above. He cut fantastic figures out of paper, strung them on threads, then made their shadows do a weird ballet to modern music. Why not get the scissors and snip your own shadow dancers? •

Conjuring up characters with scissors, Boullet whittles a flying spook from black cardboard.

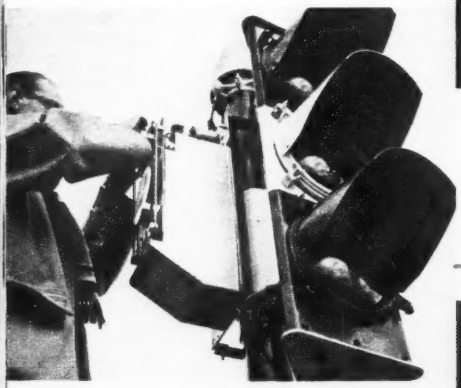
Pierre Boursaus, who helps the Parisian artist stage his shadow shows, tries out a paper hawk.

NEW on the ROAD

Grille Light helps you see around corners. It fits into the circle of the new Ford grille and turns one-third farther and faster than the wheels. Sherman Industries, Detroit.

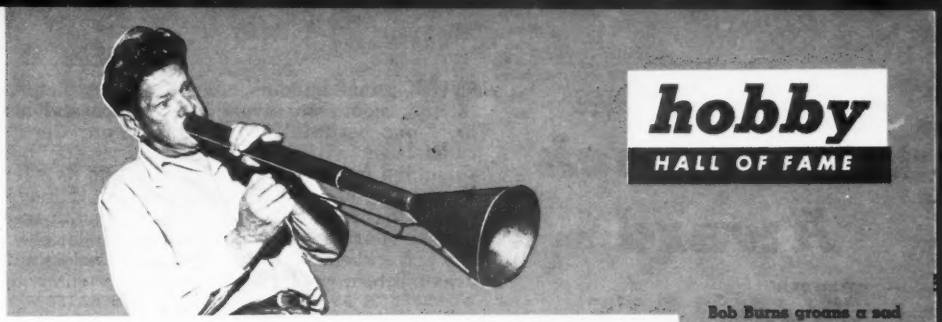
Berlin Bullet is a new German race car powered with a hopped-up, four-cylinder, "Volkswagen" motor. Although this model was constructed to train racing drivers, builder Klaus Wahldorf expects to market a sports model for $1,500.

Sponge Washer simplifies your car cleaning. It's attached to a garden hose and the water flowing through the sponge keeps pores from clogging. Abar Plastic Co., Pittsburgh.



Crossie-Talkie actually tells you when to cross the street. It's a speaking device attached to traffic lights which plays instructions when the different colored lights change. H.M.V. Gramaphone Company, Hayes, Middlesex, England.

Cat's-Eye Lenses eliminate headlight glare in night traffic. Color shield filters light thus protecting retina from blinding brightness of approaching cars. Charles O. Dechau & Son. Providence. R. I., makes them.



hobby
HALL OF FAME

Bob Burns groans a sad note on his bazooka, left. Below, Bob's nine-year-old son, Billy, tries out the new pedal-mobile built in his dad's shop.

'Bazooka' Burns—
Workshop Cut-up

CUTTING up comes naturally to Comedian Bob Burns. When he was 15, he broke a string on his "guee-tar" as he was playing music with a bunch of kids behind a plumbing store in Van Buren, Ark. Just for a gag, he picked up a 1½-inch gas pipe and bugled on it. When the kids gave him a glad hand instead of a hot foot, he rolled up a paper and slid it into the pipe to make like a crazy trombone player.

On that sour note, "the bazooka"—the musical monstrosity that blasted Burns to fame as a funnyman—was born. In glorifying his gas pipe by adding a sliding section and an old funnel top, Burns cut up lots of scrap and finally blew himself to a fancy workshop. Besides booping on his bazooka, he works in wood, makes toys for children, shelters for birds and fishing rods for himself—on a rig of his own design.

That gas-pipe gag not only tooted "Bazooka" Burns into big-time comedy but made a real craftsman out of a cut-up. •

Making a hobby horse for a workman's kid, below, gives Bob a good excuse for using some of his shop's many tools for working wood.

Workbench Award Winners...

THE proud builders of each project pictured this month are five dollars richer and also have our beautiful Workbench Award Certificate. Their entries were chosen, as the best submitted for the month. Why not send us a few photos of yourself with your project? If judged one of the best received during the month we'll publish your picture, send you a five dollar check and a Workbench Award Certificate. Enclose sufficient return postage and mail your entry to: **WORKBENCH AWARDS, MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y.**

One of the sleekest looking "midget-midget" race cars we've seen in quite a time is this 6-foot job submitted by Jack Fisher of Euclid, Ohio. Jack writes: "This car was built by my father in his home workshop and required about a year to complete. It is powered with a reworked Briggs and Stratton gas engine and weighs only one hundred and ninety pounds. Speed is about 30 mph. It features a fluid drive, quick change rear end, shock absorbers and hydraulic brakes. Like it?"

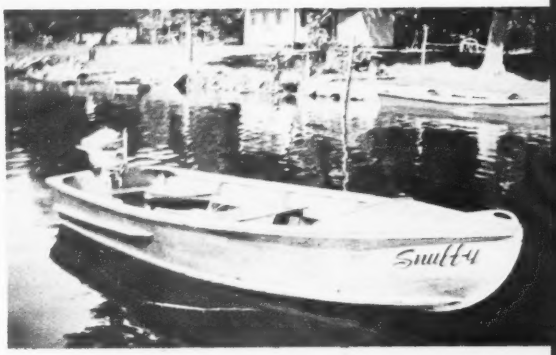
James Klappis, of Ontario, Canada, built this unusual looking sport car. Writes James: "The body is made from 16-gauge sheet steel with all seams welded. The chassis and engine are from a 1936 Pontiac with 'minor alterations.' The entire project consumed about a year of spare time and I must say the car attracts a great deal of attention on the road."

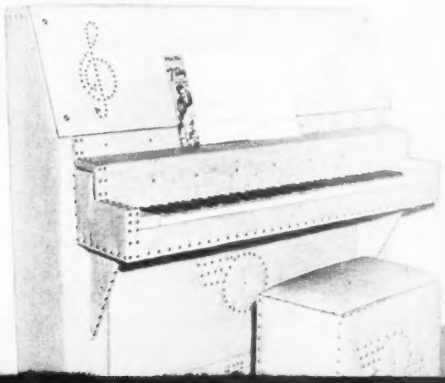
Alfred Trumbull of Penn Yan, New York, built this cozy trailer and, as should be expected, is very proud of his handiwork. Writes Al: "This 15-foot trailer was designed by the writer and is made from aluminum. It is fully insulated, wired, sleeps four and rides very well." If enough readers are interested in the project we'll contact Al for the story. How about it, trailer fans?

That's 15 pounds of B-26 model being held by H. A. Sturtevant of Glendale, California. Designer and builder of this mammoth job, H. A. required two years to complete the project. He writes: "This 7 foot B-26 was scaled up from four inch drawings and carries the color scheme of the 397th Bomb Group, which operated in Europe. It is powered with two Super Cyclone engines and also features small electric motors for operating the flaps and gear. Three flights have been made."

R. Glenn Ammer of Glenview, Illinois, built this beautiful model of Mr. Mulligan from MI Plan No. 374. Glenn writes: "I installed a Madewell 49 in my Mr. Mulligan which makes it rather "hot." It also has a cabin door through which the batteries are changed and ignition "ails" corrected. This job is really a "looker" and therefore doesn't see much flying. Right now it is on display in a hobby shop. I expect to enter it in many of the coming contests this summer and fall."

Snuffy, MI Plan No. 955, is one of the most popular boats ever to be built in a back yard. Oscar Beaudoin of Ottawa, Canada, submitted this fine photo and letter. "I worked on this boat for about four months, and find it performs very well with my Evinrude. I certainly found your plans very easy to read. We have been reading MECHANIX ILLUSTRATED for many years and enjoy your plans."





"Your December, 1948, issue of MECHANIX ILLUSTRATED gave me the idea to modernize my old piano," writes David G. Peyton of Pittsburgh, Pennsylvania, who took these before and after pictures, "and I must say the idea was a good one. The project required about 24 hours in time and less than 50 dollars in material cost."

MI's Whirlaway

Buzzing around a pylon is the original Whirlaway. Switch on pylon was later extended to outside of flight path for safety of model and "pilot."

This 11-inch electric motor driven airplane "flies" around a pylon for hours at a time. An ideal indoor project for beginners.

By Douglas Rolfe

EVER think of powering a model airplane with an electric motor? We always had a yearn to develop such a project, but until the correct motor made its appearance such a model was impossible. Now that we do have the suitable motor available, the Mini-Motor or Supermite power plants that not only are very consistent but extremely light for the amount of power produced, we believe a new phase of model building is here—and the MI Whirlaway is the proud father!

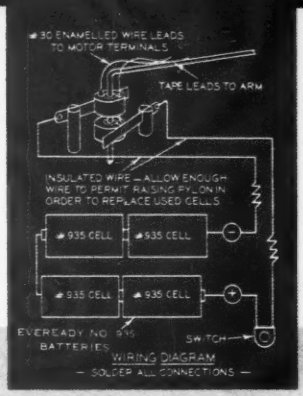
Mounted on a colorful pylon containing the flashlight batteries which in turn drive the electric motor, the Whirlaway actually will "fly" for hours. In its present form the model makes a very realistic toy but its principle can be applied to racing of two or more models from the same pylon, speed trials, etc.

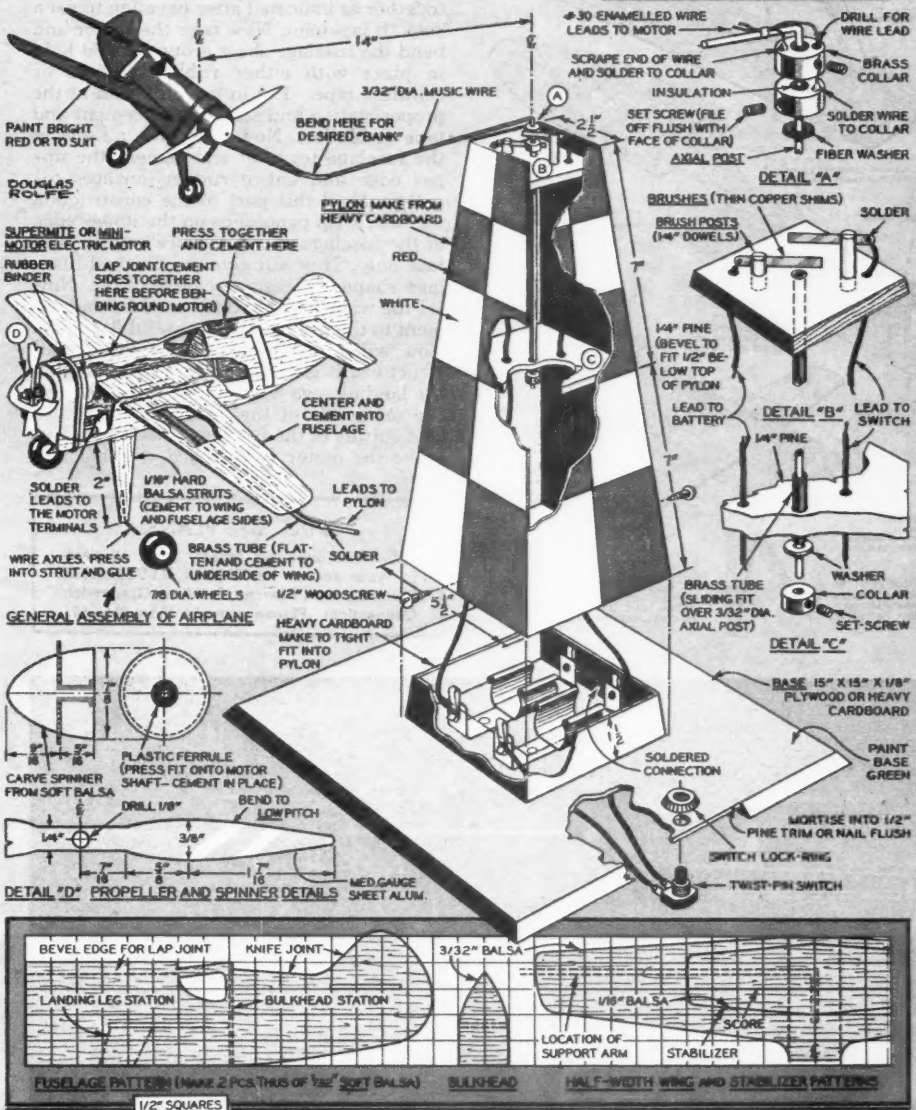
So if you want something different in the line of models, something that will give you hours of fun during building and flying, then clear off your workbench and make way for your Whirlaway.

Construction can start either with the pylon or the plane. Both are extremely simple to make. Let's take the pylon first. This consists of two units—the pylon proper and the base. The pylon can be made from four individual pieces or cut in one piece from heavy cardboard (No. 80 Illustration board is excellent for the purpose) and scored and folded to shape. In either case the checkerboard design should be ruled off in waterproof black ink and the red blocks filled in with red dope or paint before assembling. A ¼ in. pine platform is fitted ½ in. below the top of the pylon and

another similar platform occurs 7 in. below the top of the pylon. These details are clearly shown and explained in the drawings.

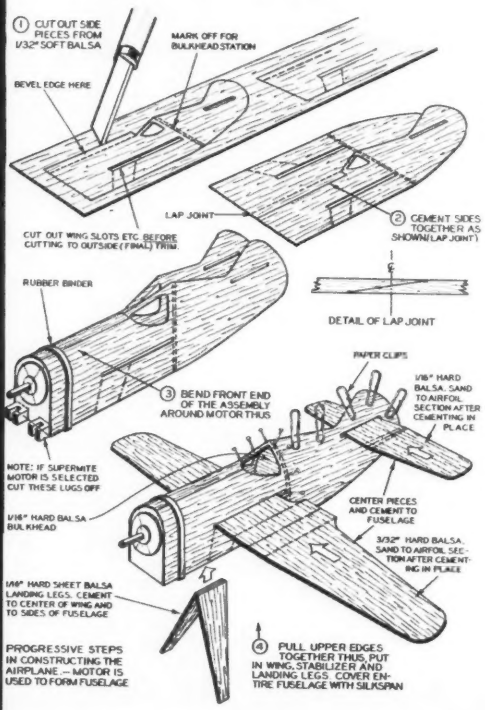
The base can be made as shown in the drawings or may be made from a piece of ½ in. pine. If the latter is used, it will have to be routed for the switch unless, and this is a suggested improvement on the given switch arrangement, a remote blip-switch is hooked up. The experimental model has the switch in the base of the pylon and this proved to be an awkward arrangement and a





hazardous one both to operator and plane. Our suggestion is to use a blip-switch on a length of wiring so that the operator is at all time free from the whirling plane.

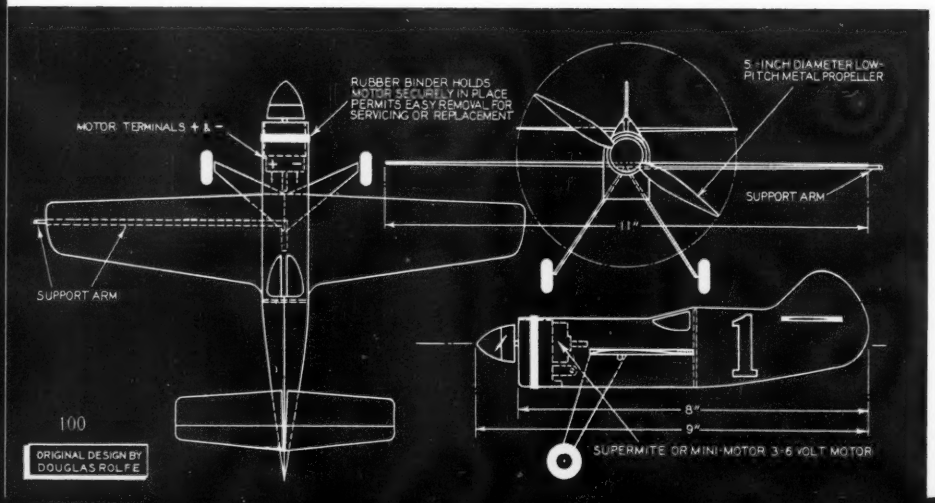
In making the base make sure that the projecting part fits into the base of the pylon snugly. Secure the battery clip or clips (depending on whether you decide to use two or four cells) in place and set up the basic wiring. Wiring leads from battery to top of the pylon and to the switch can be any medium gauge insulated electrical wiring. Solder all connections. This is most important as all possible resistance has to be minimized to get results.

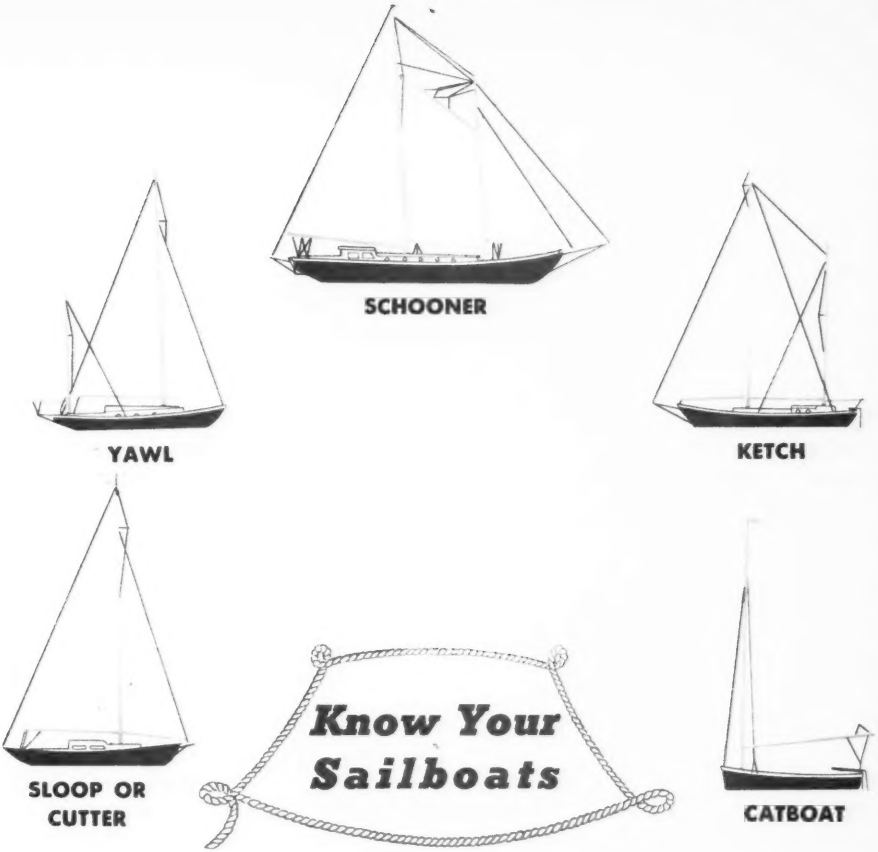


The plane is simplicity itself. Parts required are two fuselage sides, one bulkhead, a single piece wing and the stabilizer. All are cut from hard sheet balsa except the fuselage sides. These should be $\frac{1}{32}$ in. flexible balsa which can be easily bent and formed without steaming. Cut out the fuselage sides slightly beyond the given line and sand to exact shape. Join the front ends together as indicated after beveling to get a smooth lap-joint. Now take the motor and bend the fuselage sheet around it and hold in place with either rubber binders or cellulose tape. Put in the bulkhead at the proper station and secure with cement and tape or binders. Now draw the tail end of the fuselage together and cement the upper edge and entire rudder surfaces together. Hold this part of the construction together with paperclips on the *upper edge* of the fuselage and the entire rudder surface only. This will give the finished fuselage shape a pleasing reverse curve. Now set the wing and stabilizer in place and cement to the fuselage after careful lining up. You will now have a surprisingly stiff structure. It is further stiffened by adding the landing legs which come to an apex on the underside of the wing center section. The bottom of the fuselage is left open. Remove the motor [*Continued on page* 155]

FULL SIZE PLANS

will make building easier. Send 50 cents for your set to: MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Connecticut. Please specify Plan No. 401.





By S. Ralph Maurello

TO most landlubbers, any boat with sails is just "a sailboat." Such terms as yawl and sloop are either given a wide berth or mercilessly mixed up. Since sailboats now abound to the point where often you can scarcely see the water for the sails, it's time that we learned to be more discriminating in our choice of terms. They fall into definite classifications. The masts and sails are the clues—watch for their number, size, and arrangement. Let's consider the rigs in order of simplicity.

Catboat. Has a single mast, placed forward in the boat, and carries one sail.

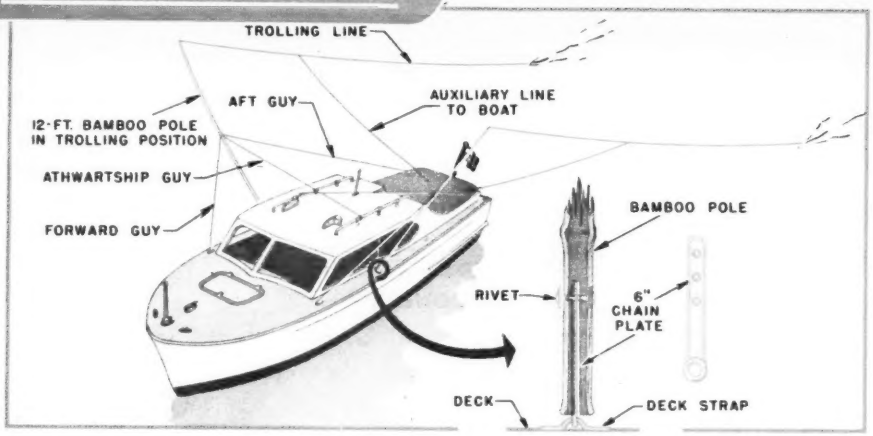
Sloop or Cutter. As far as the beginner is concerned, these terms are indistinguishable. Like the cat, it has a single mast—but it has *two* sails. The forward one is the smaller and is called a jib. The after one is known as the mainsail.

Yawl. Has two masts, with the after one being the shorter. The sails, starting at the bow, are called the jib, mainsail, and mizzen. The rudder is located *ahead of* the after mast (mizzenmast).

Ketch. Same as the yawl, but with the rudder *aft of* the mizzenmast.

Schooner. Usually has two masts, but the forward one is never the taller. The sails are called (again starting at the bow) the jib, foresail, and mainsail.

Sails are triangular (jib-headed) or four-sided (gaff) in shape. The schooner illustrated has a combination of both. •



OUTRIGGERS... *Down-East Style*

By Elon Jessup

Saw off butt of bamboo pole at joint so you can get at hollow space inside, bore a rivet hole all the way through the pole, insert the chain plate, and rivet pole and chain plate together.

BOATOWNERS who have had occasion recently to buy gadgets and equipment for their dream ships—and that includes all of us, for we're notorious gadgeteers—have had plenty of cause to ruminate on how little today's shrunken dollar will buy. Readers of MI, however, are fortunate because they know how to beat present-day prices—they know that practically every small-boat fitting can be made, with a very small outlay of cash, in their own workshops. And the wise boatman realizes that any work attempted during the boating season, when the water is warm and the breezes are idyllic, is apt to prove irksome; so he schedules his projects for completion during the winter and spring months.

One type of equipment that most of us seem to want sooner or later is a pair of fishing outriggers. You can buy beautiful pole holders for the purpose. They have nice bases that screw to the deck and tricky sockets that swivel in all directions, they're beautifully chrome-plated and cute as a picture . . . and they're darned expensive! Then, too, you'll have to add the cost of the outrigger poles and rods and reels to your total outlay. That's all very nice if you're Mr. Gotrocks, himself, but it's pretty tough to take if you are, like I am, what the politicians and economists call the Common Man. Which lengthy preamble brings us to the subject of this article— "Outriggers . . . Down-East Style."

Fish will grab a lure trolled from an outrigger when they won't touch one from a hand

rod. Fishermen say it's because the outrigger's lure tends to stay clear of the boat's direct wake. Most Down-East outrigger outfits are simple homemade affairs. Outwardly they resemble the intricately stayed structures you see on costly big-game fishing boats, but the actual operation is different. Big-game boats, despite all the rigging aloft, actually catch their fish on hand rods. With the Down-East outriggers, a fish that has taken the lure is hauled in hand-over-hand. This unique system might be termed a sort of combination of rod fishing and handline fishing, with a good deal of trolling thrown in.

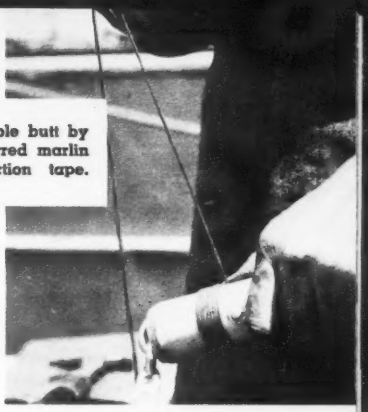
In the drawing, note that rods and reels are completely absent. Instead, you have two 12-ft. rough bamboo poles that stand upright when not in use and are dropped outboard to a 45° angle when fishing. In addition to the poles, all that are needed for the rig shown here are a few lengths of ¼-in. cotton line, two chain plates about 6 in. long, and two metal deck straps to fit through the eyes of the chain plates, the deck straps being screw-fastened to the deck.

Six lengths of the cotton line are used as guy ropes to hold the two poles upright, three to each pole. These are made fast to the middles of the poles and run forward, aft, and athwartship to appropriate deck fittings such as cleats and hand rails. You will need two more lengths of the cotton line, one for each pole, to serve as the advance lines that constitute the first sections of the actual fishing lines.

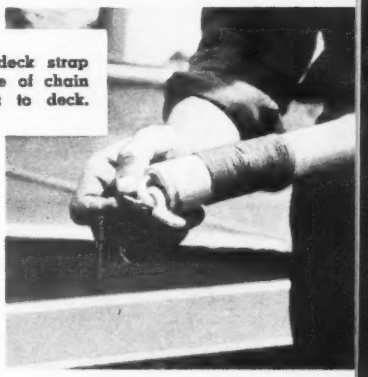
Each of these advance lines is cut to a length slightly more than the distance from the tips of the poles to the stern of your boat; then each line is made fast to a pole tip. To the outer ends of the lines, attach 1½-lb. sinkers (called cod leads in New England); then add conventional fishlines and lures. The sinkers keep the two trolling lines running straight astern. Without them, the lines would foul and become snarled whenever the boat made a turn.

Short auxiliary lines running from the cockpit to the trolling lines complete the rig. When a fish strikes, you haul in the proper auxiliary line until you reach the trolling line. The job of the outrigger is temporarily over. It's now a case of hauling in hand-over-hand and landing your fish.

For storing your fish until you return to port, get a couple of packing cases and fill them with chopped ice. •



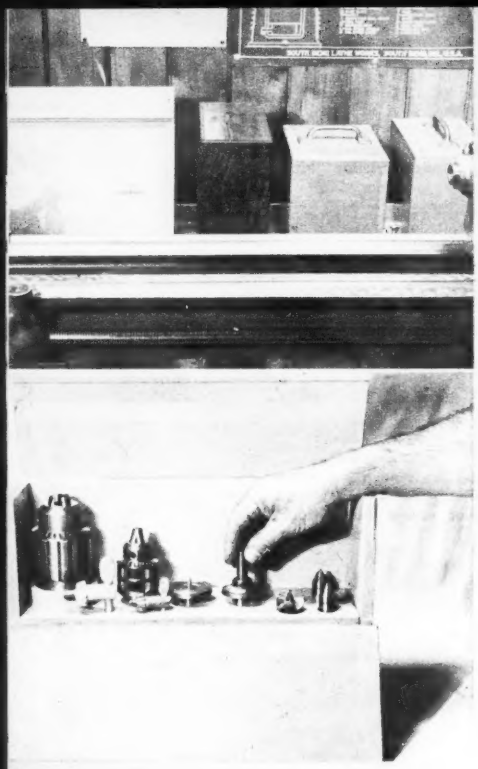
Reinforce the pole butt by seizing with tarred marlin or regular friction tape.

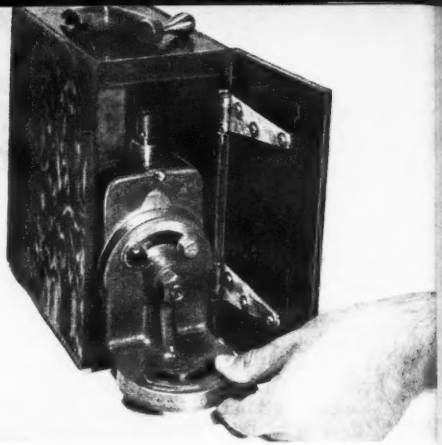


After shoving deck strap through the eye of chain plate, screw it to deck.

When securing the trolling line to the pole tip, use a splice, then seize well.

Splicing sinker in place. In the foreground appear the fishline and leader.



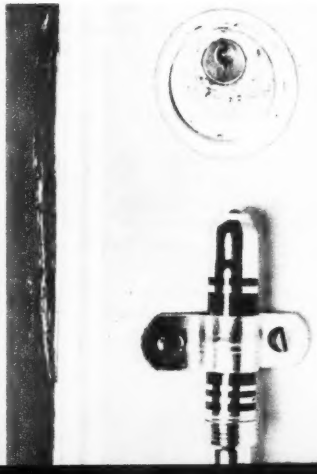


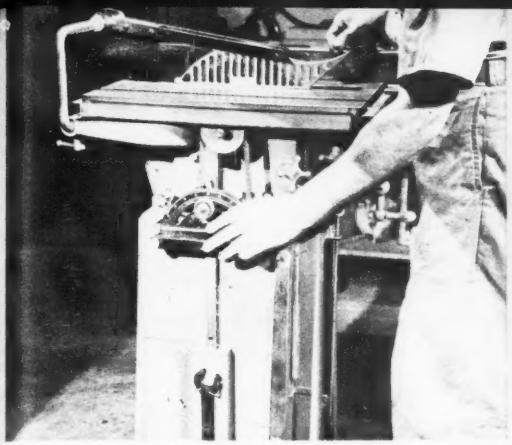
Accessory Boxes near a lathe provide the valuable near-at-hand storage space needed for the numerous attachments that the craftsman is bound to accumulate. The photo at upper left shows a group of typical boxes. Reading from left to right, they contain small chucks and centers, a milling fixture, and two large chucks. Scrap wood was used and all the surfaces were enameled.

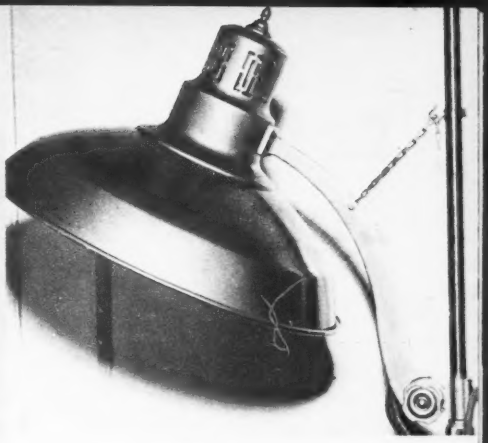
Home and

Keyhole Light. To avoid having to fumble around for a keyhole in the dark, fasten a small flashlight to the door with a conduit bracket and a couple of wood screws. When you come in at night, just press the button to flood keyhole with light. To replace worn-out bulb or battery, simply loosen screws enough to slip the flashlight out.

For Hams. Small meters, such as volt-ohmmeters, can be read with less difficulty if you make scrapwood stands to support them at 45° angles. Finish stands with paint.





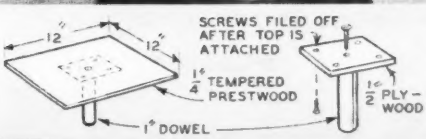


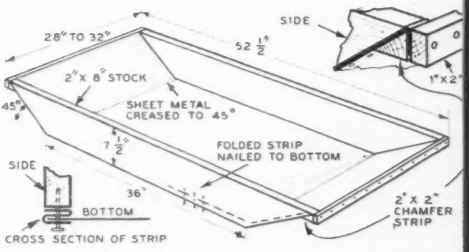
Your Miter Gauge, when not in use, can be conveniently stored at the left side of the circular saw, just under the table. Don't just hang it on a couple of nails—the vibration of the motor is likely to jar it loose. Instead, make a shakeproof sheath for it by running a groove, equal in length to the length of the gauge's arm, down a two-by-three, and screw it to the saw base.

Sun-Lamp Support is given, preventing the heavy reflector assembly of a household-type sun lamp from dropping, by connecting a short length of sash chain, as shown. On the reflector arm, drill a hole to take a 6-32 screw, which passes through one end of the chain. On the lamp upright, drill a hole for a cup hook. Solder a nut to this to secure it.

Shop Kinks

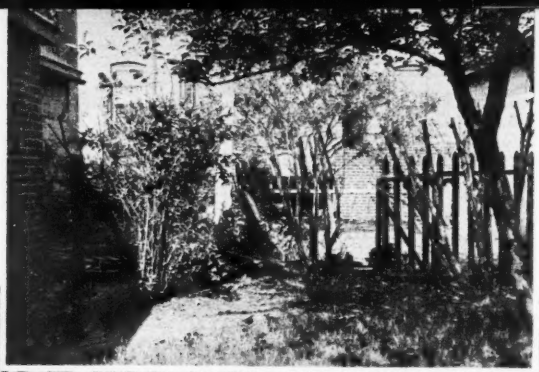
Plasterer's Hawk. Made from scraps, this hawk for plaster and masonry work is light and serviceable. The top piece is ¼x12x12-in. tempered Prestwood with the smooth side up. A center hole is bored and countersunk for a wood screw. Screw-fastened to top is a ½x4x4-in. plywood piece. File off protruding screws and add dowel handle.

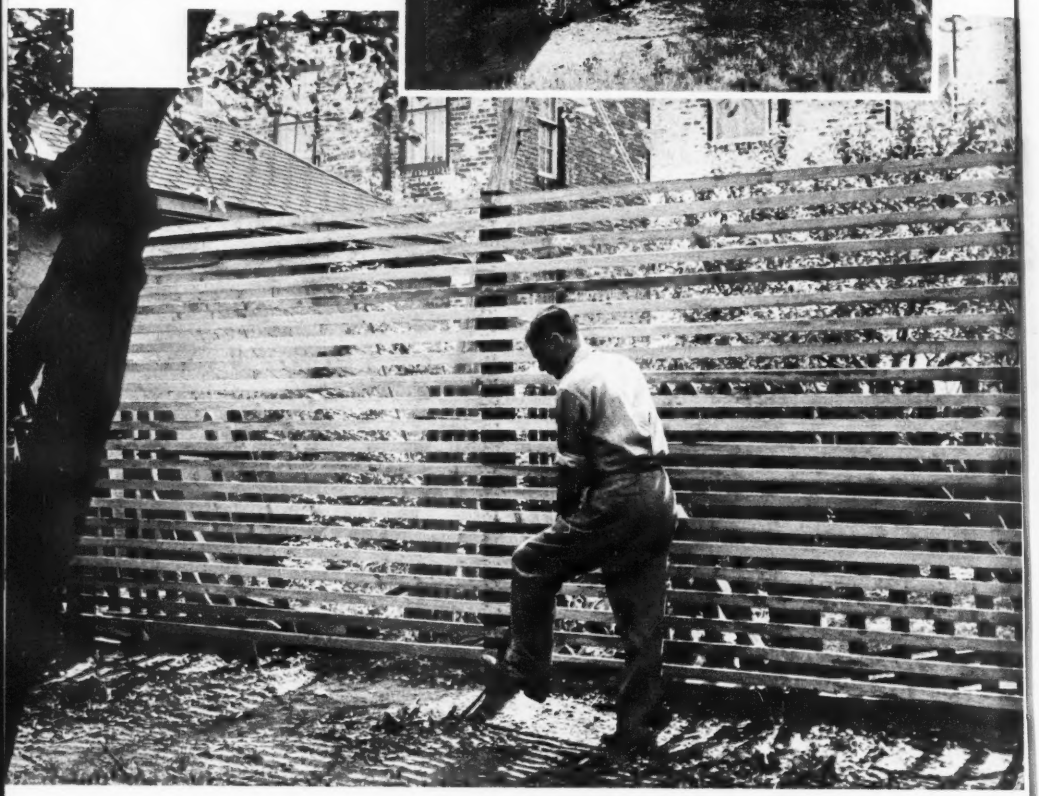




Mortar Box. The smoothness of this trough makes it easy to clean. All necessary dimensions appear in the drawing. Secure air-duct S-straps at the sides with roof nails 2 in. apart.

trellis fence





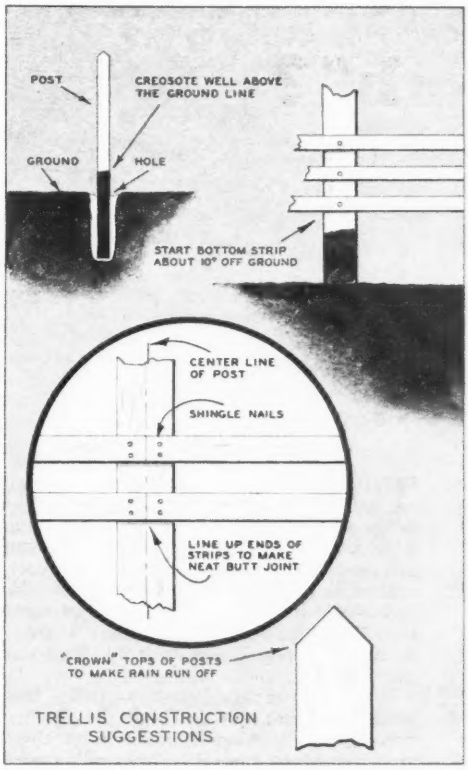
Replace that broken-down back fence with a new trellis. It gives privacy and is a fine base for rambler roses.

By Robert Hertzberg

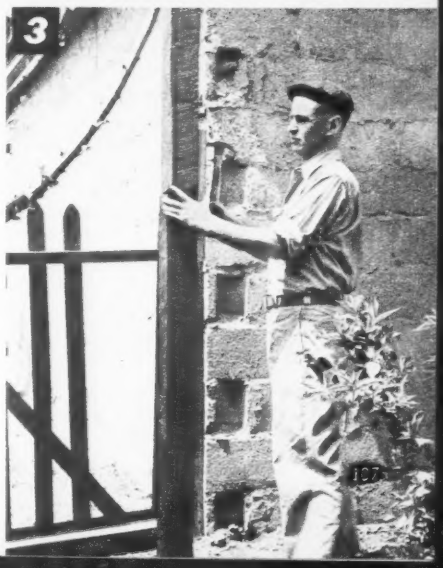
THE fence along the back edge of my house line was a dozen years old; so I wasn't surprised when it collapsed all at once after a bit of a windstorm. The question then was, "Should I put up just another fence, or try something different?" My wife was consulted and the answer was, "Something different."

After visiting the local lumberyard and recovering from the shock induced by the price quotations, I did some careful planning—for once—and it certainly paid off. Instead of using expensive redwood pickets, I bought a couple of bundles of furring strips in 16-foot lengths, a pound of galvanized shingle nails, and a gallon of "Fence-Post Preserver," which is ordinary creosote. I had some old 4x4 posts, but if I hadn't, 2x4's would have served as well. The result is not a fence, but a trellis that will soon be covered with vines and ramblers. Even the bare trellis itself

Suggestions for constructing your trellis are given in the drawing below. Right, reading from top to bottom: 1. The most important step in making either a fence or a trellis is to thoroughly creosote the posts. 2. Dig the postholes deep—the posts need a lot of underground support. The ground is easiest to work after a rain. 3. Line up the posts and tamp down earth around their bottoms until it supports them squarely and firmly.



TRELLIS CONSTRUCTION SUGGESTIONS

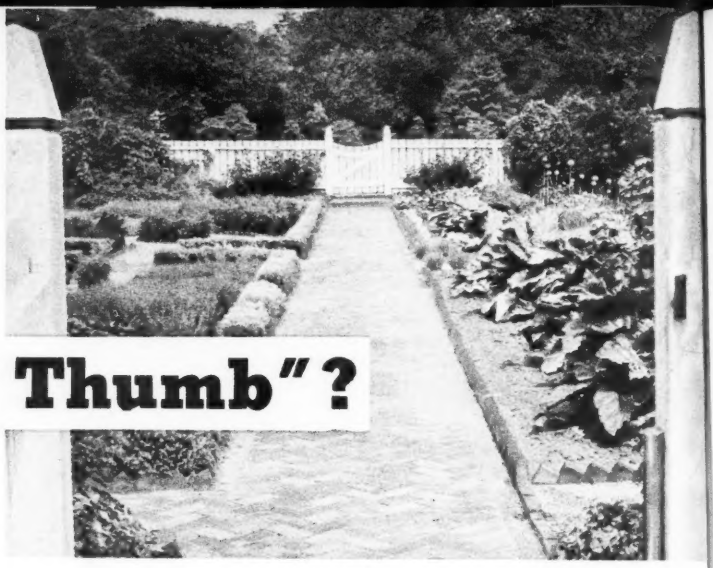


is so attractive that it has elicited the begrudging approval of my backyard neighbor, who at first regarded the structure as a spite fence. The whole operation took most of a Saturday and part of a Sunday morning to complete.

Furring is low-grade wood measuring about ¾x2 in. It is normally nailed to the inside of house framing to form a foundation for plaster. Its main virtue is its low cost. Used outdoors for a trellis, and given a coat of white paint, it looks wonderful.

The arrangement shown in the accompanying pictures was designed for a specific location. The same simple method of construction is adaptable, of course, to other space requirements. [*Continued on page* 160]

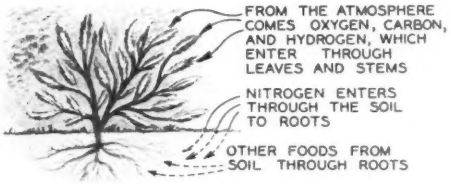
do you have a "Green Thumb"?



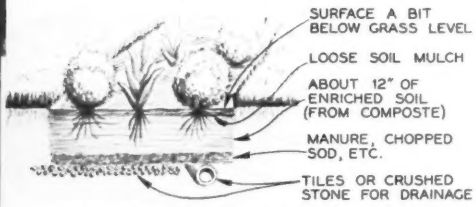
A poet once said, "Gardens like these are made by men on their knees." How true!

How your garden grows is entirely up to you. Success takes some know-how, a bit of back-break, and eternal vigilance.

By John P. Arnold



BOTH THE AIR AND THE GROUND CONTRIBUTE TO A PLANT'S LIFE AND GOOD HEALTH



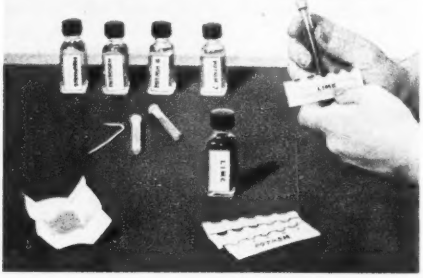
TYPICAL FIRST-CLASS PERENNIAL BASE-BED

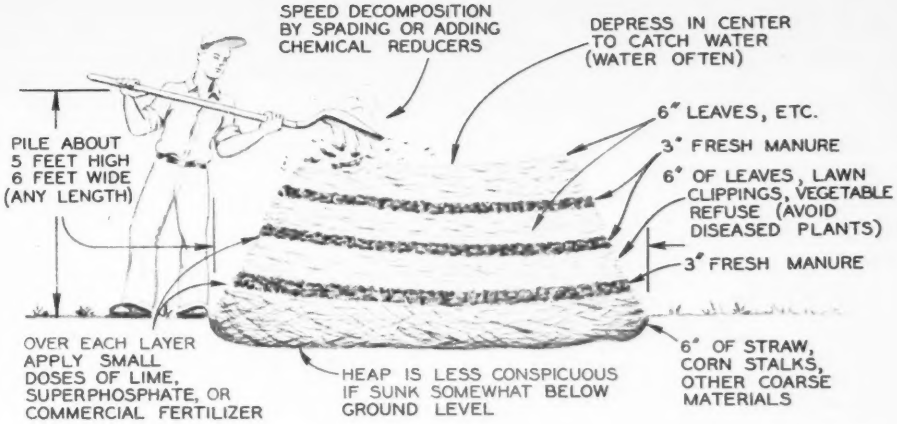
THIS IS THE DIFFERENCE BETWEEN WETTING AND SOAKING SOIL. SUN AND AIR SOON EVAPORATE A SPRINKLING, WHILE A SOAKING CARRIES WATER, AND ROOTS, DEEP.

THE lad who invariably grows outsized vegetables and the lass whose flowers never wither away and die are said to have been born with a green thumb. Having acquired their knowledge instinctively, such folk will have little need for the facts given here, and you'd be surprised at the number of people everywhere who are willing to forego them entirely. But not you and I. . . .

If we observe things a bit, we notice that plants will not put up with the dietary shenanigans that man imposes on them and, indeed, on himself. They will thrive

Soil tests are the bases for determining the growing conditions. Simple kits, as shown here, contain necessary materials.





SECTION OF SIMPLE COMPOST HEAP-AN ECONOMICAL FERTILIZER FACTORY

only when their preferences as to climate, soil, food elements, etc., are satisfied. These requirements differ from species to species and only man is pig-headed enough to try to grow everything and anything in one garden area.

Essentially, a good gardener is doctor, policeman, and caterer to the plant world and his success depends on how knowingly he performs these jobs. The man with the green thumb just goes ahead; others peer doubtfully into a fat gardening encyclopedia. Let's skim a few pages of that book.

The first chapter concerns itself with the various types of garden soil. Soil components are (1) inorganic minerals, (2) humus or organic matter, (3) bacteria, (4) air, and (5) water.

Depending on the fineness of their individual particles, soils are classified as sand, loam, or clay. Sand is the coarsest and clay, the finest. Clay holds water, but is cold and dries slowly; it bakes to a hard crust and does not readily absorb sunlight. Sand is light in texture and easily worked, but does not retain moisture. Either of these types is improved by mixing with the other and, with the addition of humus, is considered to be a good garden loam—a highly desirable soil for growing things.

Humus is an important ingredient. It improves the texture of the soil, holds water, absorbs the sun's rays, encourages bacterial action, and unlocks plant food. Humus is derived from turned-under green crops, animal manures, leaf mold, peat, sewage sludges, etc.

Plants have many food requirements, most of which are believed to be stable elements present in sufficient quantities at all times in "good" soils. This is not always the case. Boron, magnesium, iron, copper, zinc, manganese, and sulphur are among the absolutely essential materials required for vigorous plant growth. Persistent failure [*Continued on page* 158]

KNOW YOUR SOIL BEFORE YOU WORK IT. SIMPLE TESTS WILL REVEAL IT'S INGREDIENTS.

CULTIVATE OFTEN TO KEEP SOIL ACTIVE AND RID AREA OF CROWDING WEED ROOTS

SPREAD MULCH AROUND PLANT BASES TO CONSERVE MOISTURE AND WARD OFF WEED GROWTH

Here's the first part of a two-installment story by David D. Beach, Jr., Naval Architect, with an introduction written by Clyde Randall, pioneer Cracker Box builder and owner-driver of well-known racer, Ski-Bee.

How To Build RFD–

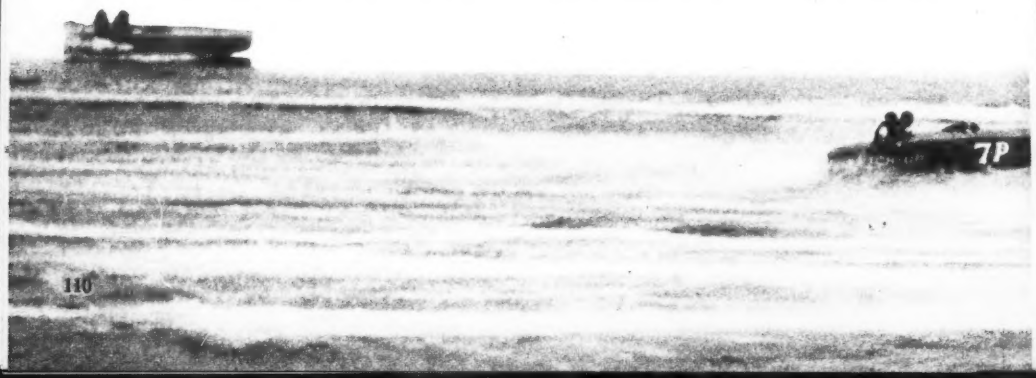
A CRACKERBOX SPEEDBOAT

INTRODUCTION. *For all of you boating enthusiasts who have been itching to try your hand at the wheel of a really fast boat, the Cracker Box is the answer to your prayers. Raced under American Power Boat Association sanction, it is a backyard boatbuilder's dream come true because, having flat bottom and sides, it takes few tools to build, yet it has all the sleek lines of a manufactured job.*

The racing rules are lenient in regard to the engine you can use. A piston displacement of 260 cu. in. is allowed, which includes almost any automobile-engine conversion. Most of the fellows now racing are using Mercury V-8's or Ford 6's, either one of which is good. Even stock models give a top speed of between 35 and 40 m.p.h., and when you hop them up with high-compression heads, dual carburetors, and the works nobody knows how fast they will go. As of this writing, George Zimmer's Ski-Mon Demon *holds the one-mile record at 63.99 m.p.h., and the sky's the limit this season.*

It isn't too hard to figure out what propeller to use—most manufacturers can recommend exactly what you need. However, I can tell you a little about it in case you have to order by mail. We have found that a two-blade 12 by 15-in. or 12 by 16-in. wheel is best for racing with a hopped-up Mercury or Ford V-8, but for towing skiers a three-blade 12 by 14-in. prop seems to have more power and get-away.

It seems like building a boat is a lot of work, but you'll be surprised at how fast RFD *goes together. And when you get behind the wheel, you'll be as sold on the Cracker Boxes as I am.*—Clyde Randall.



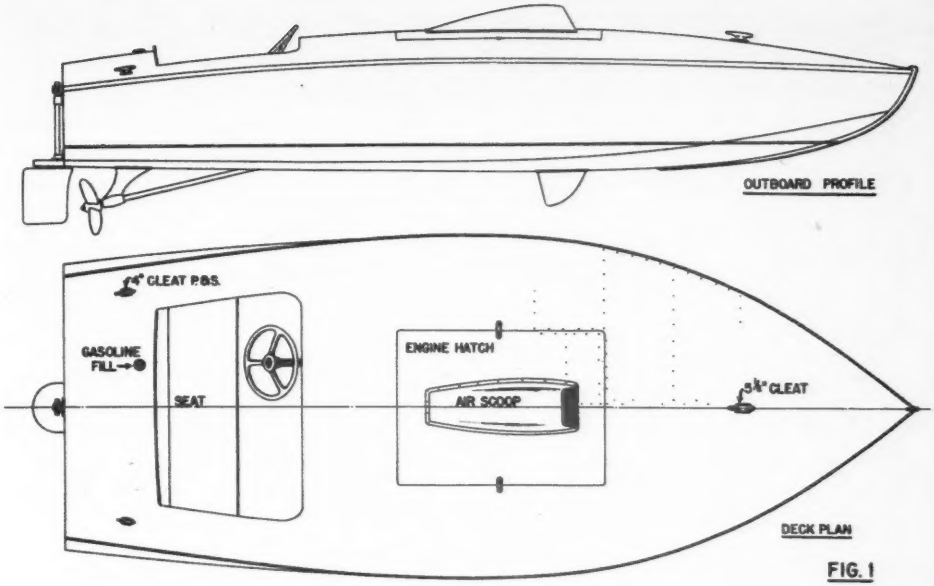


FIG. 1

DESIGNED in accordance with the latest rules and specifications of the Cracker Box Speedboat Association, *RFD* will appeal to both the professional boatbuilder and the amateur enthusiast alike. It should have double appeal for the engine expert who is at home with such things as dual carburetors, milled-down heads, and high-lift racing cams.

Cracker Box boats are members of a truly "one-design" class. The shape of the hull and certain other major details are fixed, thus no one boat can have an advantage over the others by virtue of superior design. Races are won by the boats having the best drivers and the best mechanics. Overhead valves are not allowed unless the stock engine comes equipped that way, no V-drives or gear boxes are permitted, and the engine must be mounted ahead of the cockpit—but in all other respects, a mechanic can demonstrate his talents as master of his engine in any manner he chooses.

Now let's look at the plans. Fig. 1 shows a simple V-bottom craft of normal appearance. The deck is broken only by an air scoop and spray cover for the engine. The cockpit is without plain or fancy windshield brackets or step pads. The utility of the boat is of prime importance and excess weight is a penalty. This design is for a racing runabout; so fancy fittings have been left in the catalog. When extra money is available it can be spent on new manifolds or a set of new cams — that's where performance comes from, not from chrome plate!

In spite of its big-boat performance, the boat is not big in size. The over-all length is but 15 ft. 6 in. and the beam is 5 ft. 8 in.

Photo by Kent Hitchcock

A typical Cracker Box boat in frame, showing the simple construction. This boat differs slightly from RFD, having chine gussets and a different bow.

The cockpit is almost 4 ft. wide and will seat two people in ample comfort. The large engine hatch provides adequate working room around the engine. Forward of the engine is a watertight bulkhead, which imparts a degree of safety not usual in racing runabouts.

Fig. 2 shows the lines and offsets. The three views should be carefully studied and then, in an appropriate place, redrawn full size. It is recommended that a couple of 4 by 8-ft. plywood sheets be purchased, secured together, and painted white. The stations are laid out carefully on a center line and the scaled offsets are marked on them. You may find minor discrepancies between the offsets and your lines, but since the Class Rules are a little flexible, you can refair as necessary. A word of caution, though—don't vary more than a few eighths from the offsets or your boat may not measure inside the allowable tolerances.

Draw in the sheer, chine, and keel-face lines with battens that are at least 10 ft. long and ½ in. square. When the sections are laid out, label each on the outside so the identifications will not be covered up when the frames are assembled on the full-size drawing. Note from Fig. 4 that the station lines coincide with the after faces of Bottom Frames 1 to 7 and with the forward faces of Bottom Frames 8 to 12. Station 13 coincides with the after face of the transom.

Lay out and assemble the frames right on your full-size section drawing. Dimensions in Fig. 3 are given to the inside of the planking; so no deductions for the thicknesses of the deck, sides, or bottom are required. In Fig. 5, note that Frame 1 is cut from one piece. Every other frame has two side pieces and one bottom piece. Assembly of a frame is simple. The side pieces are aligned on the bottom piece and, after ample glue has been applied, two fastenings (bolts or screws) are fitted as shown on the detail of Frame 2. When all the frames are cut out, our attention can be directed to the bulkhead on Station 4; then to the transom.

The bulkhead framing is almost like the other frames except that the pieces are half-gained into one another, as shown. The bulkhead proper is ⅜-in. waterproof marine plywood, screwed and glued to the forward face of the frame. The fastenings are No. 8 flathead wood screws, 1 in. long, spaced about 3 in. between centers. The access opening in the bulkhead is cut with a keyhole saw. The cutout portion is framed with ½x1½-in. oak to provide a cover for the opening. The transom is similar to the bulkhead except that it has a tiller opening, as illustrated.

When the frames are assembled, the next step is to make the engine girders. The bottoms of these girders are straight. Note in Fig. 5 that they are mounted on two low sawhorses. Suitable clamps and wedges are used to align and hold the stringers in place while the frames are being erected. The stringers are laminated (a fancy term for glued together) from long pieces of 1¼-in. fir or spruce and facings of ¼-in. mahogany plywood. The stringer pieces are not to be spliced but are to be a full 12 ft. 5⅜ in. long.

The dimensions for the depth of the engine stringers are shown in Fig. 4. Space the stringers to suit the spacing of the engine hold-down bolts. Bronze $\frac{5}{16}$-in. through-bolts are used to hold the frames to the engine beds, counterboring each frame for the heads; then plugging. The transom and bulkhead are secured to the ends of the stringers by bolts through the bottoms of the vertical stiffeners. Temporary battens can be used to hold the assembled frames, transom, and bulkhead from shifting while the keel and stem are fitted.

The stem is laminated from three pieces of ¾ by 2-in. oak, steamed and bent to shape over a strongback. They should be glued and screw-fastened together while still on the form. The bevels for the stem can be taken directly from the lines at Stations 1, 2, and 3. Some builders prefer to plane the bevels on the erected boat, taking the proper angles from sprung battens laid along the bow frames to the stem.

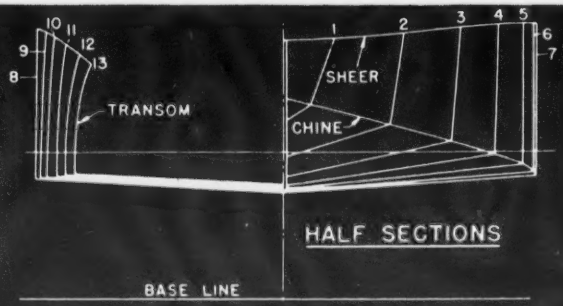
The keel is a single length of 1¼x4-in.

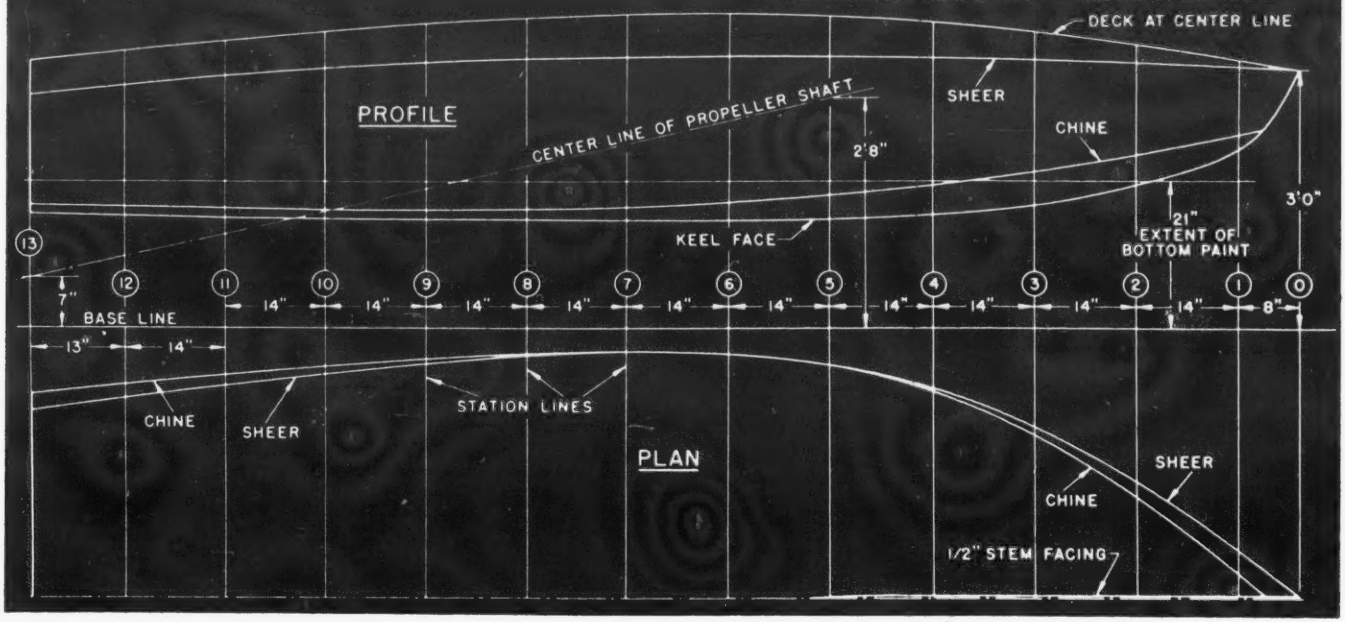
FIG. 2 - LINES AND OFFSETS

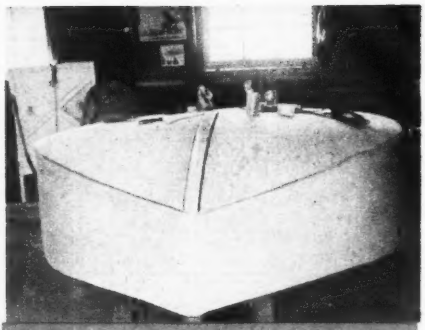
TABLE OF OFFSETS

- INCHES AND EIGHTHS OF INCHES TO OUTSIDE OF PLANKING -

		1	2	3	4	5	6	7	8	9	10	11	12	13
HALF-BREADTHS	CHINE	3·4	14·1	22·6	28·5	32·3	33·6	34·2	34·0	33·3	32·3	31·1	29·6	28·4
	SHEER	6·6	16·2	23·7	29·2	32·3	33·6	34·2	33·6	32·5	31·1	29·6	23·0	26·2
HEIGHTS FROM BASE	KEEL	24·3	19·7	17·0	15·6	15·1	15·0	15·0	15·1	15·1	15·2	15·3	15·5	15·6
	CHINE	25·7	24·0	21·6	19·7	18·4	17·4	16·7	16·4	16·4	16·4	16·5	16·7	17·1
	SHEER	36·1	36·6	37·2	37·5	37·6	37·7	37·6	37·4	37·0	36·2	35·2	33·7	32·4
	℄ DECK	37·2	39·4	41·3	42·6	43·4	43·6	43·6	43·2	42·4	41·3	40·1	38·5	37·2







Put the side planking on first, then the bottom sheets, using glue and screws to secure the easily applied marine plywood.

oak and is beveled to provide a landing for the bottom planking. It is tapered in width forward of Frame 4 to meet the 2-in. stem. The 9-in. scarph between the keel and stem falls on Frame 3. Set the ¼-in. bronze scarph bolts into the keel from the bottom and plug them. Two $\frac{3}{16}$-in. bolts are driven into the keel at each frame, staggering them to avoid splitting the frame. Care should be taken to check the alignment and position o[illegible] keel and of the stem, which extends forwa[illegible] of the bulkhead. Frames 3, 2, and 1 are now screwed in place to complete the hull framing.

Notch the frames for the sheer clamp and chine. This is done by tacking a long batten to the frames and cutting the depth of the clamp or chine after the batten has been faired by eye. The 1 by 2¼-in. oak chines are fitted first, starting from the transom and working both in simultaneously. These should not require steaming and should go in fairly easily. One long screw is driven into each frame through the chine to secure it, two being driven at the transom and the stem. The stem is notched for the chine and clamp, this notching being done as the members are faired in and fastened. Liberal libations of good marine glue should be applied wherever two pieces of wood are fitted together. Wipe all excess glue away as soon as the fastenings are driven home—nothing will spoil a varnish job as much as glue streaks.

Next comes the side planking. Use five-ply ¼-in. marine plywood, either fir or mahogany. Be sure you get marine-bonded or exterior plywood as the planking is quite important to the appearance and life of your craft. Preferably, each side should be made from one length. You can template the shape of the side panels or they can be cut and trimmed while clamped directly to the frames, sheer clamp, and chine. It isn't advisable to trim the sides exactly until they are completely fastened to the boat.

After the panels are cut to shape, start securing them in place. A good sequence is as follows. First, fasten both panels in place with about a dozen C-clamps on each side. When the panels are properly positioned, remove the clamps holding the after ends so a glue brush can be used between them and the transom, after frames, chine, and sheer clamp. Paint on a liberal amount of glue and reclamp the panels to the structure. Then *work fast*. Using a stoppered bit, bore through the plywood for the fastenings. As all planking fastenings are No. 8 flathead wood screws, use a ⅛-in. bit and stopper it so about ¾ in. is exposed. When boring, remember that unless the screws are driven normal to the frames, and not perpendicular to the planking, they might stick out through the frame sides. Drive home all fastenings a little below the surface of the plywood. This will allow room for the surfacing putty that will give the finished boat a smooth and attractive surface. Stagger the fastenings in the sheer clamp and chine about ½ in. and space them about 3 in. apart. If you desire, a glue-soaked cotton wicking may be placed between chine and planking. However, a tight fit, well glued, is ample.

Work forward from the after sections, removing the clamps and repeating the gluing, reclamping, boring and screwing sequence right up to the stem. Then, before the glue has set, get under the boat and carefully wipe the excess off the planking and structure. The next job is to trim the panels prior to the application of the bottom planking.

In general, the bottom planking goes on in a similar manner. Be quite careful to get a good center-line butt between the port and starboard panels. Let the bottom panels extend ¼ in. or so past the chines and trim off later to a smooth and sharp edge. Note how the planking is carried back beneath the cavitation plate at the transom.

A stem covering piece, cut from 1x1-in. oak, runs from the stemhead to about Frame 4. The planking butt on the center line forward is planed for this piece, as indicated in Fig. 2, and the piece is carefully fitted and secured with 2-in. No. 10 wood screws driven into the stem and keel. A ⅜-in. brass half-oval finishes the stem.

At this point, you'd better check your sandpaper supply because the first thing you're going to have to do in the final installment next month is sand . . . and sand . . . and sand! •

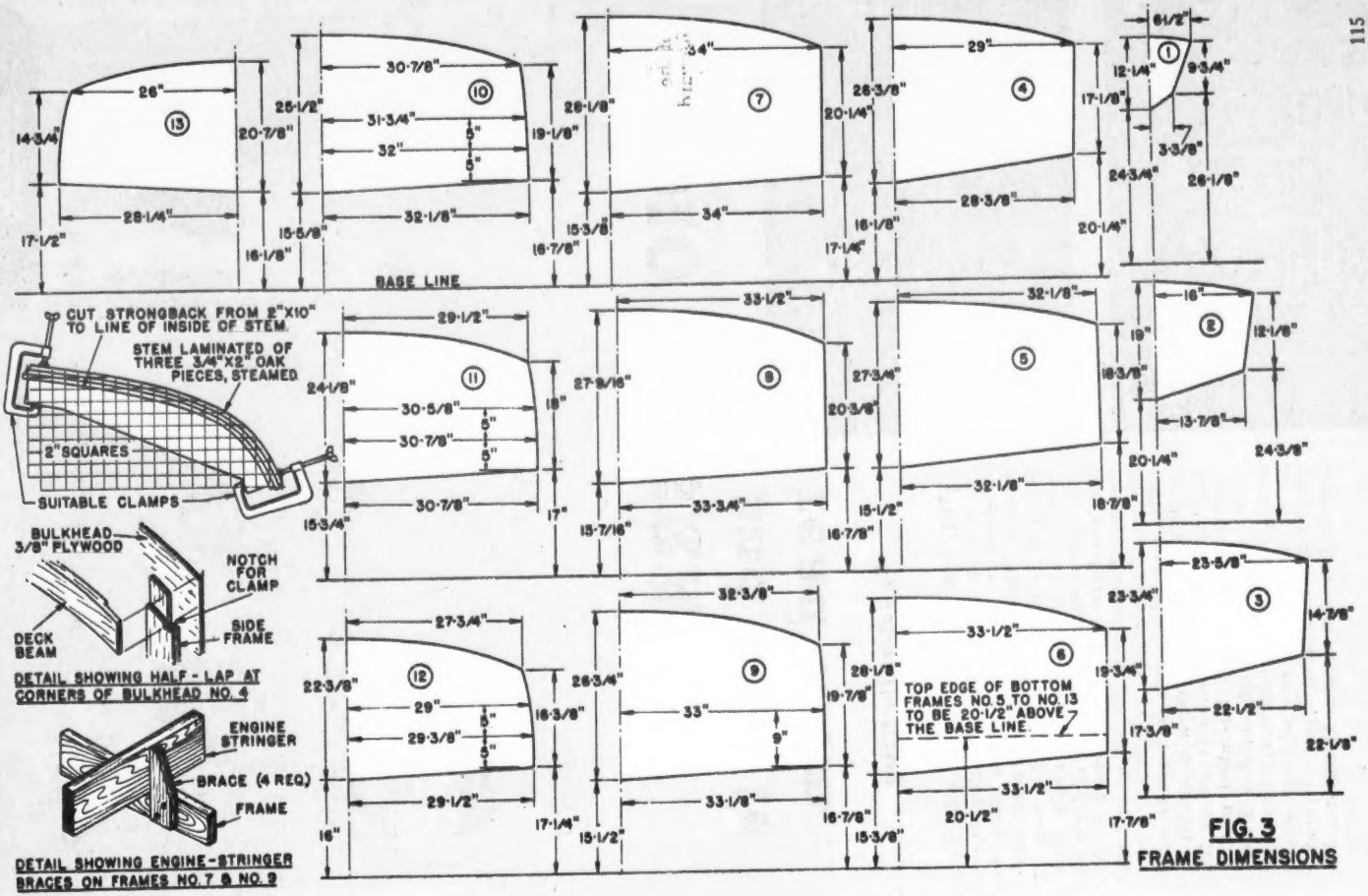


FIG. 3
FRAME DIMENSIONS

RADIO DIAGRAMS and how to read them

By Robert Hertzberg

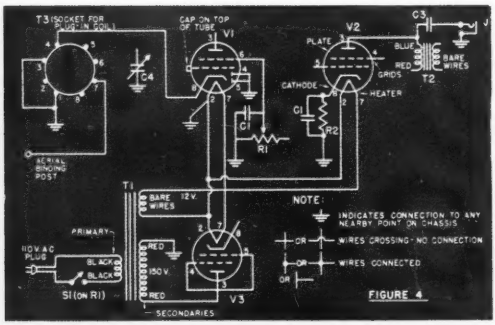


FIGURE 4

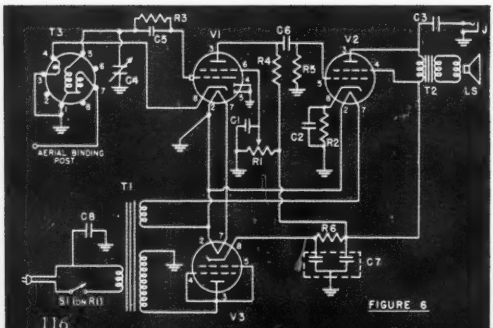


FIGURE 6

THE first time a would-be radio ham looks at the diagram of a short-wave receiver or transmitter, he is likely to exclaim, "Holy smokes, how is a guy supposed to make sense out of this mess of lines?" The answer is that every little line has a meaning all its own; add 'em up and you have a complete picture of the equipment from both the wiring and the functional standpoints.

The type of diagram universally used in all technical radio work is known as the "schematic" because it shows the "scheme" of the circuit. So-called "picture wiring diagrams," which sound as if they should be easier to follow than schematics, are actually much more confusing because they show overlapping layers of components and wires in unnatural positions. It's

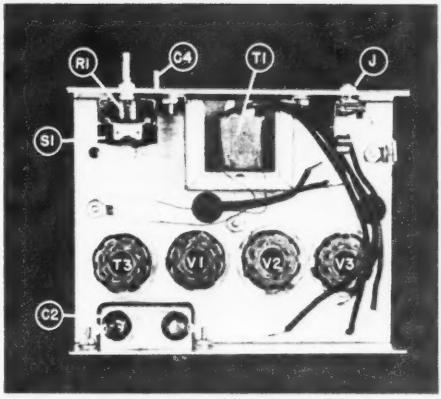


Fig. 2: The underside of the "Heathkit" three-tube beginner's receiver kit showing the fixed parts in position but no wiring operations performed as yet.

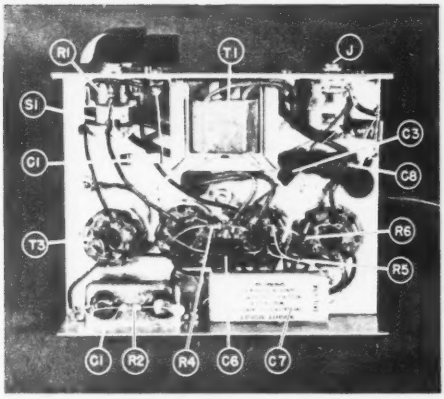


Fig 5: Now the set has been completely wired. It corresponds with the schematic diagram in Fig. 6. The underside of chassis is shown here and at left.

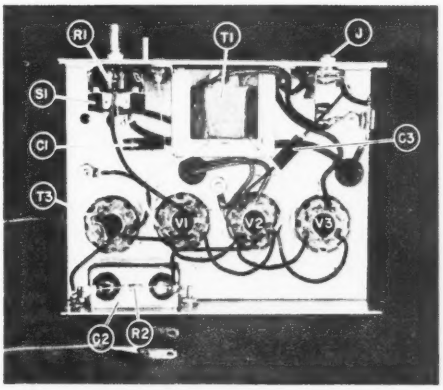


Fig. 3: Here, the wiring depicted in the schematic drawing (Fig. 4) is shown as it actually appears when installed under chassis of our example set.

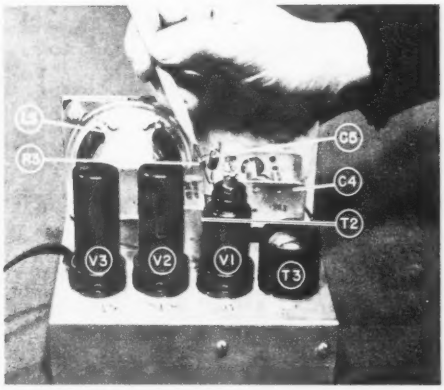
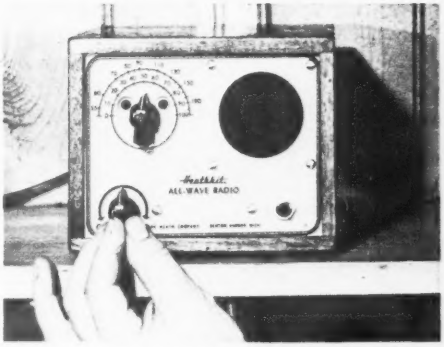


Fig. 7: Top view with plug-in coil (T3) and tubes in position. Pencil points to combined R3 and C5, which are between stator of C4 and grid cap of V1.

easy to learn the hang of schematics, and once you do you'll find you can build and wire radio sets with a minimum of effort.

The number of basic units used in radio and television equipment is surprisingly small. What makes many diagrams *look* complicated, even though they aren't, is the multiplicity of units of one kind. For instance, in a typical television kit sold for home assembly there are more than a hundred little resistors and almost as many condensers. The same circuit symbol represents all resistors and another symbol represents all condensers, so you have only to recognize *two* symbols to know exactly how *two hundred* parts are supposed to be connected.

The function of a resistor is to resist the flow of electricity. [*Continued on page* 153]



The completed receiver, built to explain schematic wiring diagrams, performs excellently on close-by stations. It makes a neat addition to your shop.

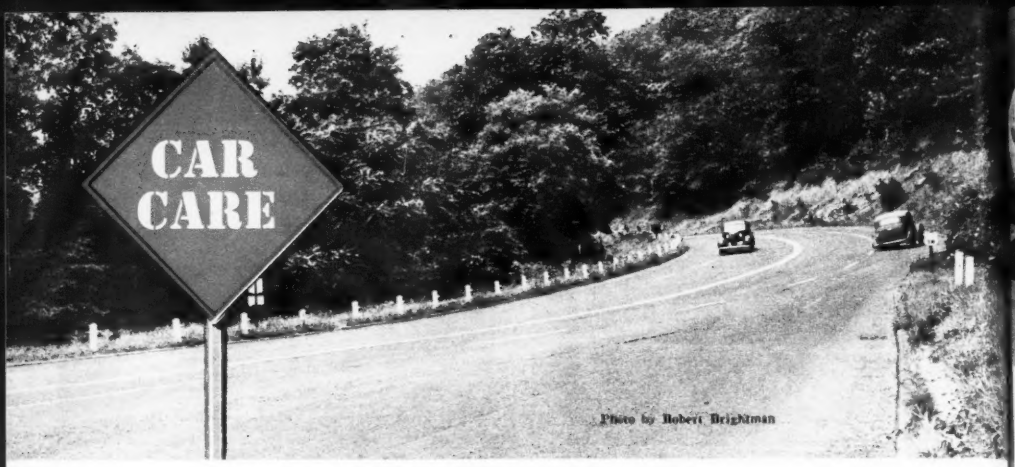


Photo by Robert Brightman

Voltage regulators must be carefully selected for replacement. One of the current mistakes is overlooking the fact that the material for the regulator's armature must match the car's electrical polarity.

Flushing the cooling system made one reader's engine run too cool. Some scale lodged in the thermostat's by-pass, thus forcing the valve to open too soon.

Low oil pressure is always reason to investigate, but it seldom calls for emergency attention. The real alarm is sudden dancing of the gauge needle which indicates a drop in oil supply and possibly a bad leak.

A thumping noise, heard when the engine is idling or when its speed is changed, may indicate a broken motor mount. If the flywheel is loose there will be a heavy and sharp knock when speed changes.

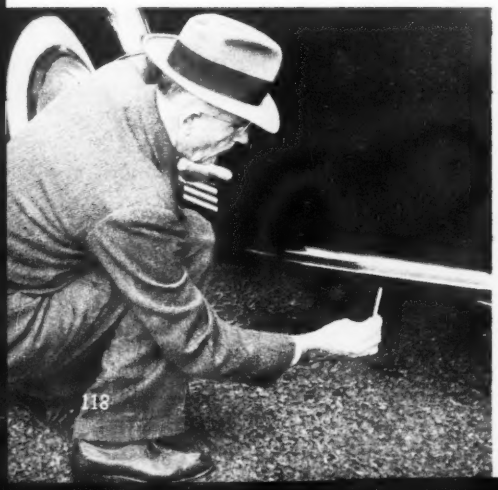
Excessive oil consumption can sometimes be traced to overambitious gas station attendants who fill the crankcase above the recommended level. Always keep the oil between the "add oil" and "full" marks, not above and not below.

Even though synthetic tubes hold air much better than natural rubber tubes still, that is no reason why you should drive around minus any valve caps. They are made to hold air in and keep dirt out.

Mysterious water beneath the dash is usually due to a faulty connection in the cowl ventilator drain pipe.

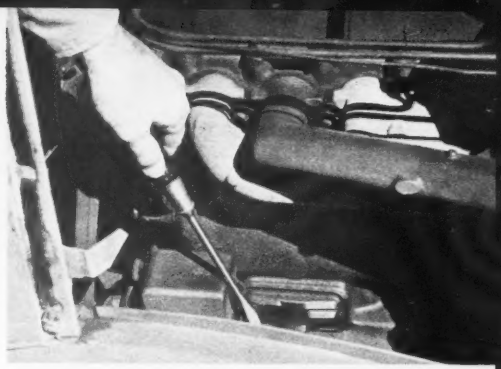
The windshield wiper assembly is usually overlooked when the car is lubricated. A good "carkeeper" will always follow up the linkage and place a drop of oil on every joint.

To prevent your door panels from rusting, make certain that the drains at the bottom of the doors are open. Just give them a poke with a pencil.



One reader swore that he had a chattering clutch. Imagine his surprise when he found out that the chatter was really due to a broken exhaust hanger.

Front tire wear doesn't necessarily mean under-inflation. It's often due to misalignment, or, improper wheel balance, due to a heavy blowout patch.



You can forestall generator trouble by occasionally snapping off the cover band and lightly sanding the commutator. Do not use emery or carborundum.

BEHIND THE WHEEL

With Fred Russell

If you want a personal reply, please enclose a self-addressed, stamped envelope.

My 1936 Essex starts easily when cold but misses quite badly until it is warmed up. Earl Stotelmeyer, Mullan, Idaho

Missing of the engine when warming up is probably due to wet ignition parts. Wipe the plugs, coil and the distributor before starting the car.

●

Can I increase the compression ratio of my 1939 Chevrolet from 6.25 to 1 to 8 to 1 by planing down the head? John P. Domanico, Chicago, Ill.

Do not recommend it.

●

My 1939 Oldsmobile has a 1946 motor in it. Yet, tappets are very noisy when the motor is cold. Andrew Andragna, Brooklyn, N. Y.

Tappet noise with a cold motor indicates too little clearance.

●

What causes my 1941 Hudson to overheat at 45 mph? I have no trouble above and below this speed. H. Norman, Jr., Mt. Vernon, Wash.

Overheating at moderate road speed often is due to a slipping fan belt.

Where can I get parts for my 1935 Graham? Mr. Olson, New York, N. Y.

Graham Paige, Auburn, Indiana

●

The rear end of my 1942 Packard started to whine right after I changed the lubricants. Louis E. Nika, Newark, N. J.

Your car requires an "extreme pressure" type of grease. Possibly the wrong kind was installed.

●

Should I increase the generator charging rate if I install Sealed Beam headlamps on my 1939 Ford? Peter Lemmerman, St. Louis, Mo.

It is not necessary but you should install a relay. This provides a direct circuit from the battery to the lamps.

●

I would like to install a tachometer on my Jeep station wagon. Where can I get one? C. G. Watts, New Orleans, La.

You can get a tachometer from AC Spark Plug Co., Flint 2, Mich.; Electro-Products, 445 E. 189th St., New York 58, N. Y.; or Stewart-Warner Corp., Chicago 14, Ill.

Heavy winter driving may have disturbed the position of your wheel balance weights. Check them now in preparation for faster summertime driving.

New safety lamp blinks red for oncoming motorists while shedding a steady white light for flat-fixing. Plugs into lighter; Alden Products.

Child's Drawing Desk

Every parent who encourages his child's urge to draw and paint will want to make this useful little desk.

By Henry Clark

YOU may not be an artist, nor even a competent doodler, but I'll lay even money that your child acts like a junior-grade Michelangelo. Usually this means paper all over the house, spattered paints, crayon stumps under the sofa, and chalk marks on the sidewalk. Not with our little girl, however. As soon as she began elbowing me away from the drawing board, and spreading her paper over mine, I made tracks for the workshop and emerged hours later with this play desk.

Except for the 1¼x1¼-in. legs, the entire job is made from a single piece of ¾x8-in. pine shelving, 8½ ft. long. Once the two side panels are accurately cut, the rest comes quickly. Screw these sides to the front and back panels to form a rigid frame. The pencil ledge is added next.

At this point, the legs are attached. Their cut and fit is optional with your child's needs, particularly in height. To avoid a seesaw action, fit and attach the fourth leg while the desk is standing firmly on all three others. This is easier and far more accurate than the age-old cut-and-try method.

Use ¼-in. wallboard for a bottom panel. The compartment thus formed is an ideal place in which to toss all the assorted papers and paraphernalia a child accumulates.

The desk lid is made last. It is doubtful whether a board 14½ in. wide can be found. Therefore, you'll probably have to build up the lid from two narrower pieces, joining them with stiffeners attached underneath. Two small butt hinges fasten the lid to the pencil ledge.

Finish the desk to suit the nursery color scheme or apply several coats of varnish, sanding well between coats.

If you don't have a suitable chair to use with the desk, you can knock one out in a half an hour, following the procedure shown on the opposite page. The dimensions given will satisfactorily fit any child up to six or seven years of age. •

Featuring a functional design and simple joints, the piece is made with ordinary tools.

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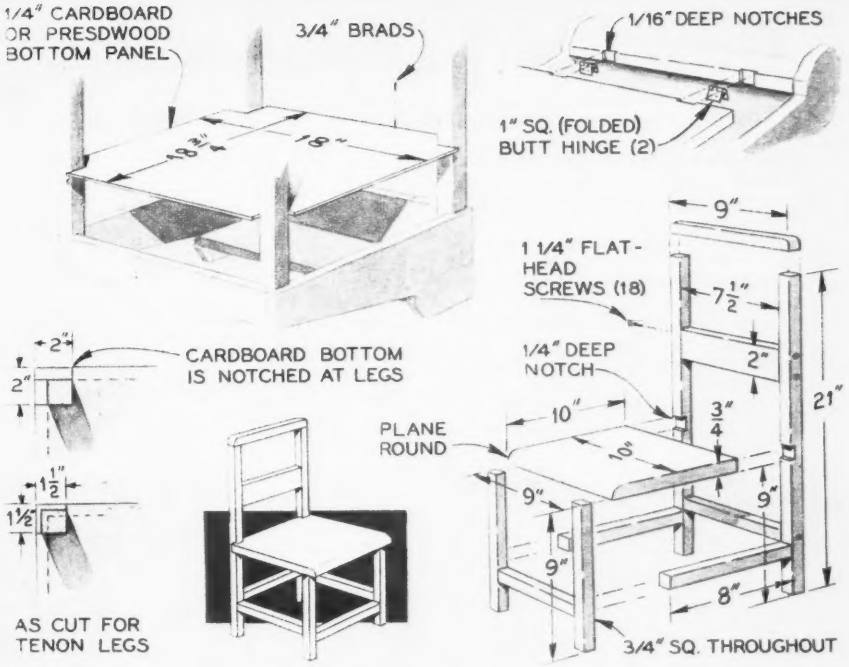
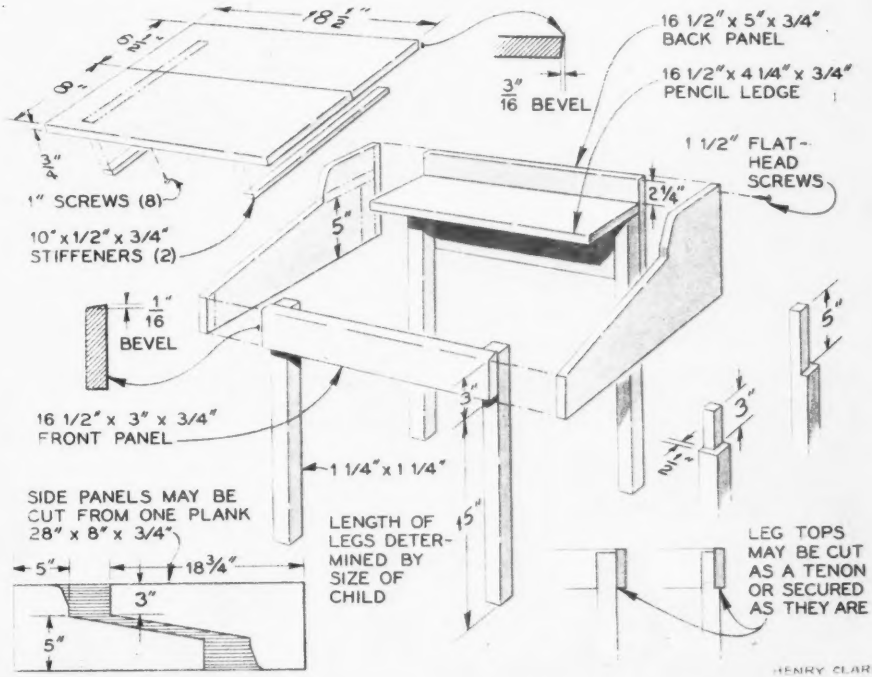


SIMPLY CONSTRUCTED CHAIR FOR USE WITH DESK



HENRY CLARK

Garden Greenhouse

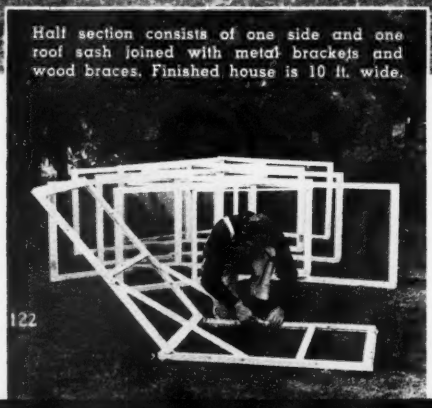
There's nothing like a greenhouse to make you feel independent of grocer or florist. This one is made of joined sash.

By John P. Arnold

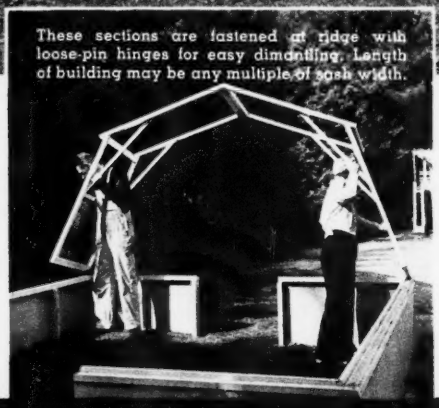
IF you want to be a year-round gardener, you must have a greenhouse—there're no two ways about that. The plans presented here take into consideration a variety of special needs. Being of the knock-down type, the house is readily assembled and quickly dismantled or can be erected permanently on a lasting foundation. It may be either a completely detached building or part of a dwelling, thus utilizing the same heating system for economy. This house can be built by the average handy man from standard sash and lumber, or it can be purchased by the drone in parts or as a complete unit which may be erected with a few hand tools.

The greenhouse is built in sections

Photos courtesy of Lord & Burnham



Half section consists of one side and one roof sash joined with metal brackets and wood braces. Finished house is 10 ft. wide.



These sections are fastened at ridge with loose-pin hinges for easy dismantling. Length of building may be any multiple of sash width.

consisting of two roof sashes and two side sashes which span a distance of 10 ft., the width of the building. The length may be any multiple of 30 in. or the width of the sash. Three to five sections are suitable if the greenhouse is to be joined to the main house; use five to eight sections for a completely detached building. Sections may be added later if there is a need for expansion.

The site should be on a level and well-drained piece of ground which allows unobstructed sunlight through most of the day. A location that screens it from winter winds is also advantageous, but it should be placed far enough away from trees to avoid the hazard of falling branches.

After the ground has been properly graded, the lines for the foundation may be laid out. The wood substructure shown in Fig. 1 is suitable for a house which might have to be removed at a later time. A concrete foundation can be substituted, but is not recommended as packed earth helps to maintain a suitable humidity. A gravel path between the benches or a raised slat walk should be installed.

The wood foundation and sidewalls consist of posts set into the ground to which the siding is nailed. These should be of even height and carefully squared as the sills rest on top of them. The use of a level is recommended for this purpose. The over-all width of the sills should

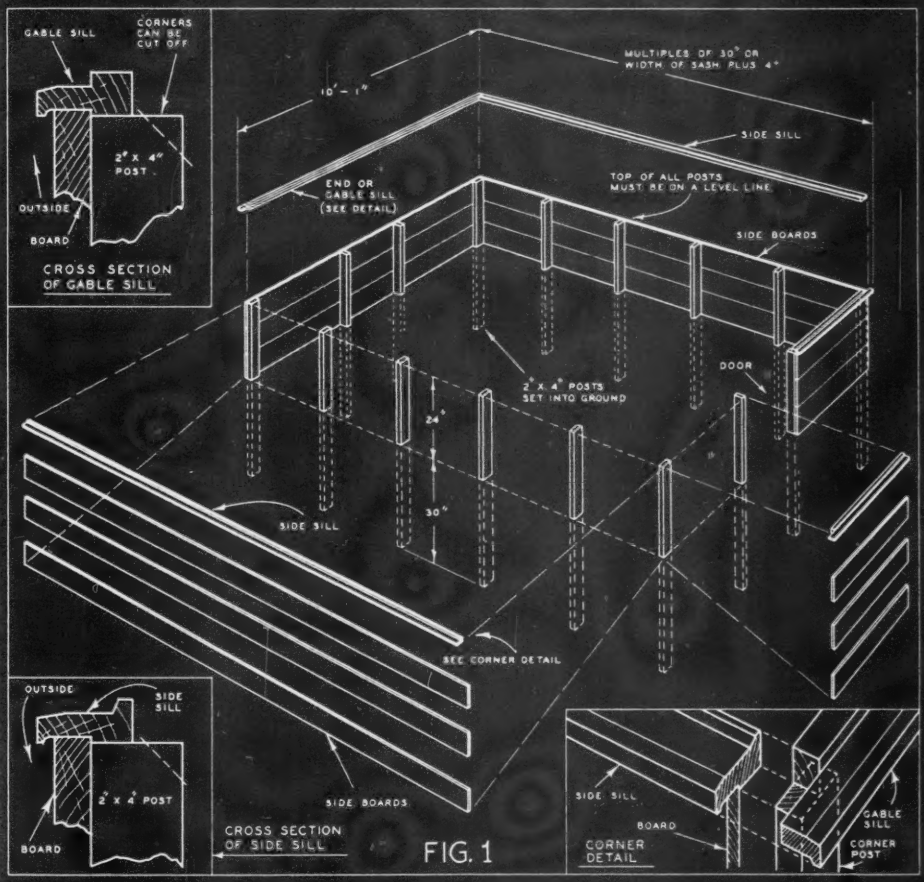


FIG. 1

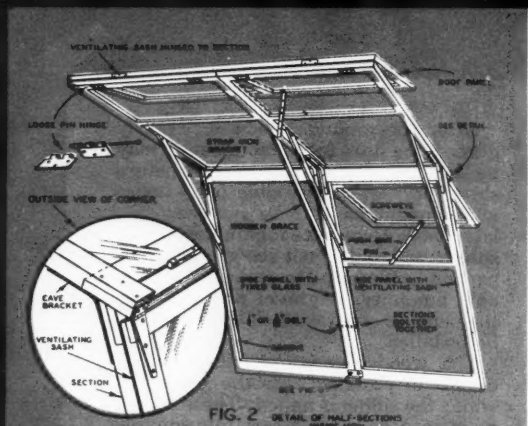
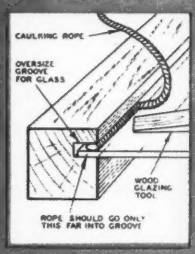


FIG. 2 DETAIL OF HALF-SECTIONS (INSIDE VIEW)



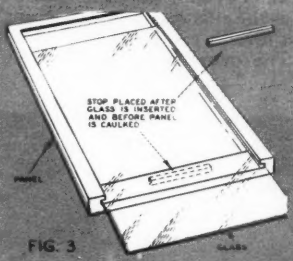


FIG. 3

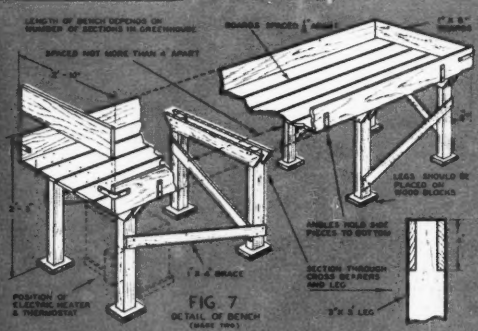


FIG. 7
DETAIL OF BENCH (SEE FIG. 1)

be 10 ft. 1 in. in any case, but the length will depend on the number of sections. This is determined by multiplying the width of a single sash by the number of sections and adding four inches.

The most suitable woods for greenhouse construction are red cedar, cypress or redwood due to the prevailing humidity. Other lumber, if treated with a preservative and primed with aluminum paint, will also do if maintenance is not neglected.

The sash construction is the major part of the job but all of the work can be done on a small bench saw. It is also possible to adapt standard mill sash, but less convenient methods of ventilation may have to be adopted. In any case it will be necessary to make the irregular sections used in the gable ends.

Two types of sash or panels are used for the roof and the sides. One has fixed panes while the others have openings over which a ventilating sash is hinged (Fig. 2). The number of ventilator panels required varies with the size of the house. Adequate ventilation is secured by alternating fixed and ventilator panels on the side walls and pairing them on the roof as shown. Departures from this plan are allowable since this arrangement was devised for convenience in installing automatic ventilating controls.

The special type of sash shown here simplifies glazing. Note how the lower stile is halved in thickness in order that the panes may be inserted. A wood strip is used to hold the glass in place. Thin calking rope is packed in the grooves to make a tight seal (Fig. 3).

FIG. 5

FIG. 6

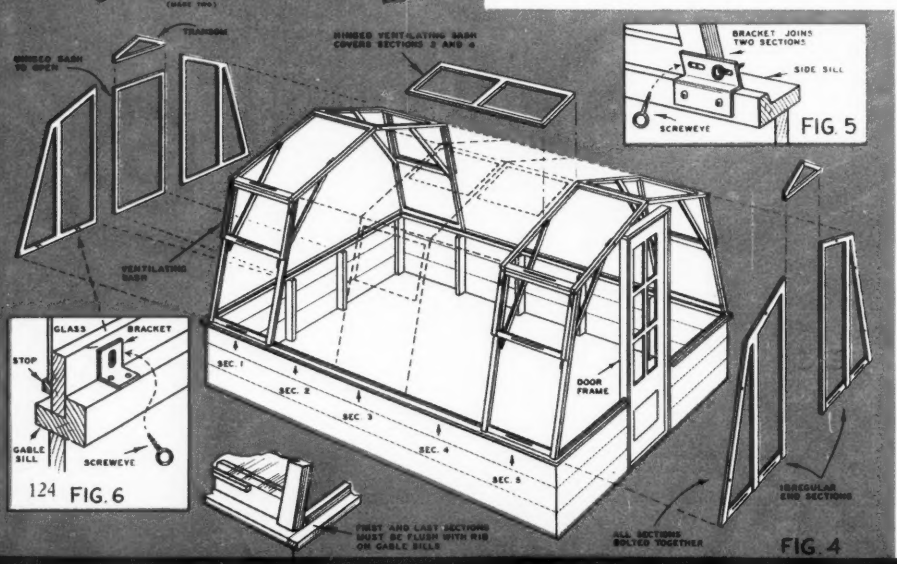


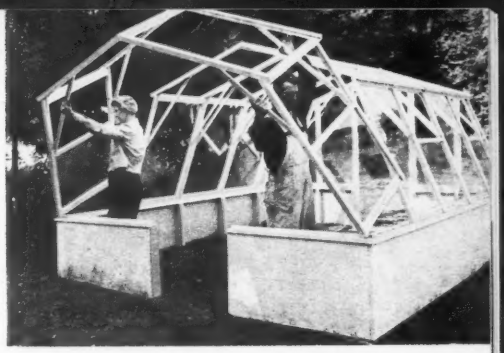
FIG. 4

Each half section consisting of a side and a roof panel is assembled at the eaves with metal brackets, which can be made from strap iron, and reinforced with wooden braces. Two of these joined with loose-pin hinges at the ridge make a complete section. The assembly can be done on the ground and a rough form or template will be useful in making each section identical. Fig. 4 shows the relationship of the various parts.

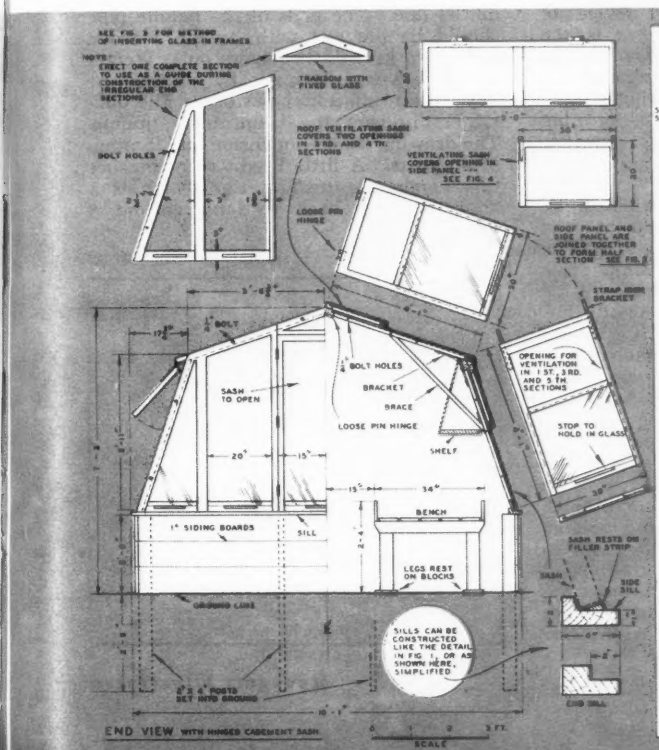
Before making the gable ends, which are not alike, it is a good idea to have one side section in place from which to take measurements for the irregular sash at either end.

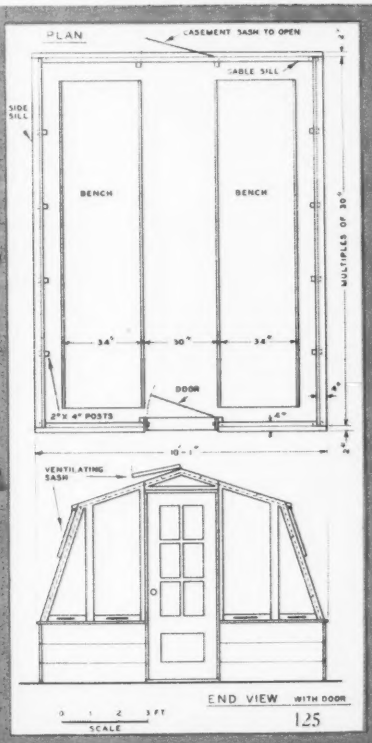
After the door and casement sash have been hung, it is only necessary to make the plant benches (Fig. 7) to complete the greenhouse. Rough lumber should be used for this purpose. Two long benches running the length of the building with a central walk is the most practical arrangement for this type of house.

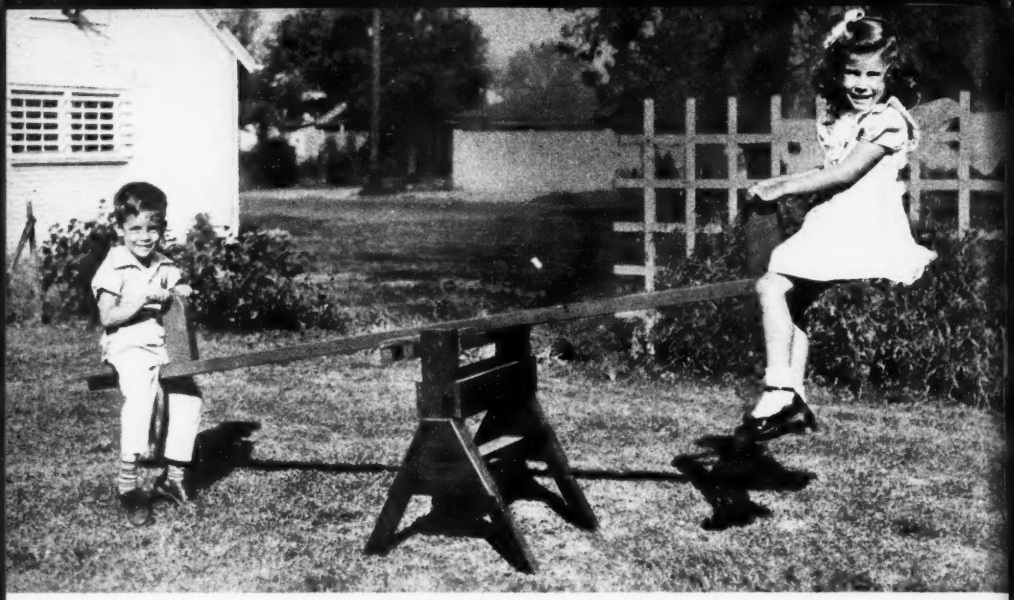
Gas, oil or electricity are the most convenient sources for heating. Electricity, however, is twice as costly as gas or oil (about $45 a season for a 13x15 ft. house in the New York area). The gardener should also investigate automatic ventilator controls which eliminate constant supervision of the greenhouse temperature. ●



Above: The last section must come out flush with the rib of the gable sill. Below: Your labor will be well rewarded when picking time arrives.







TOT'S TEETER-TOTTER

By Harold Jackson

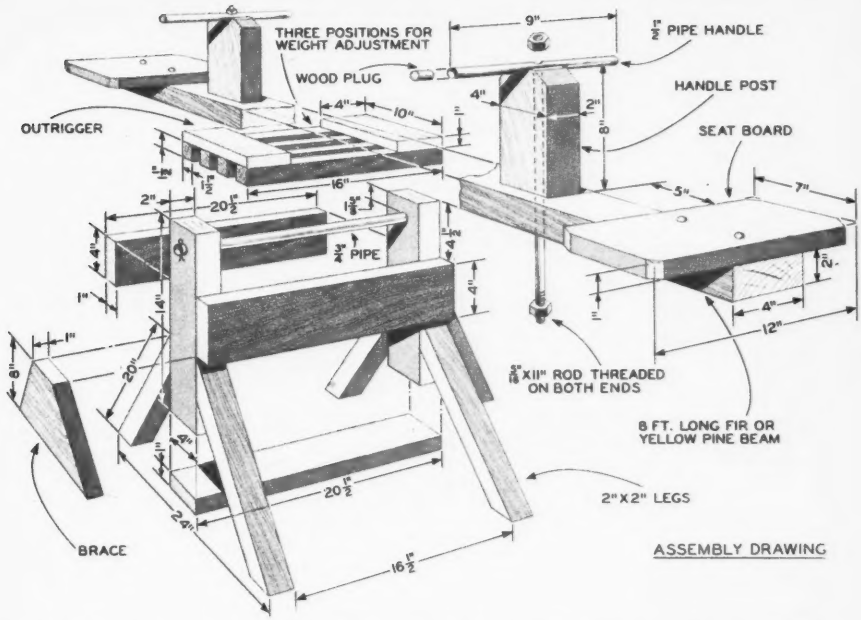
PERHAPS one of the oldest devices of entertainment for youngsters is the teeter-totter, or see-saw, as it is sometimes called. No doubt the Stone Age kids made the first teeter-totter by balancing a small log over the trunk of a fallen tree or a big stone, and even today, the teeter-totter is a standard and popular piece of playground equipment.

The teeter-totter shown here is made of short scraps of wood with the exception of the beam which is a 2x4, 8 ft. long. The trestle and beam are separate units. This makes winter storage easy by simply lifting the beam off the trestle. The trestle has 2x2 in. legs and 2x4 in. uprights. It is braced with boards as shown in the sketch. The beam rides on a piece of ¾ in. pipe placed through the uprights near the top. Cotter pins hold the pipe in place.

The beam is a clear fir or yellow pine 2x4, 8 ft. long. A seat board and handle post is attached to each end as shown. The seat board is attached by two small bolts. The handle is made of ½ in. pipe, 9 in. long. The handle and handle post are held in place by a $\frac{5}{16}$ in. rod, 11 in. long, threaded on both ends. This rod runs through the handle pipe and down a hole bored through the post and beam as indicated by the dotted line. The ends of the handle pipe should be plugged with smooth wooden dowels to keep little fingers out. Weight adjustment can be made by shifting the beam to an off-center position. The outriggers prevent the beam from tipping. The drawing shows dimension and location of all parts. A little bright paint finishes this homemade teeter-totter which is a "must" in any back yard playground. •

BILL OF MATERIALS

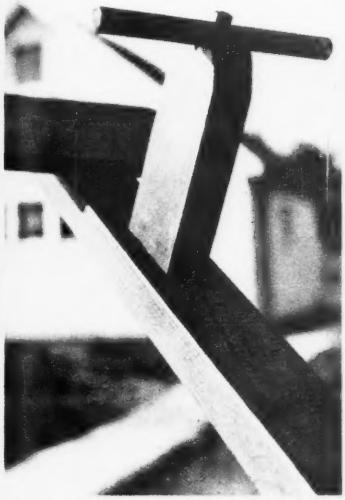
Beam	
1 Beam	2x4 in. x 8 ft.
2 Seats	1x7x12 in.
2 Posts	2x4x8 in.
4 Center blocks	1½x1½x16 in.
2 Outriggers	1x6x10 in.
2 Pipe Handles	½x9 in.
4 Seat Bolts	5/16x2½ in.
2 Handle Bolts	5/16x11 in.
Trestle	
4 Legs	2x2x20 in.
2 Uprights	2x4x14 in.
3 Cross Boards	1x4x20½ in.
2 End Braces	1x8x14 in.
1 Pipe Support	3/4x21 in.

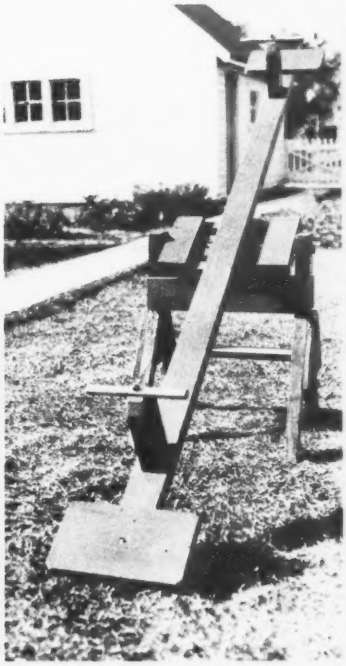


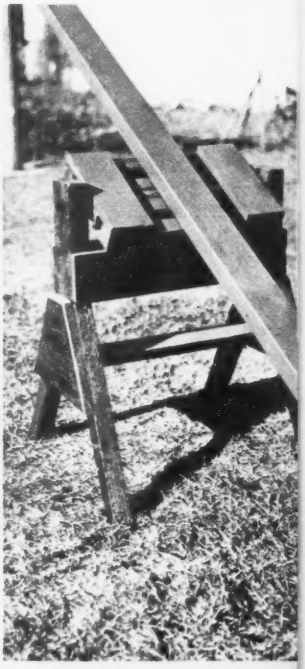
Detail of the handle and seat construction. Plug handle ends.

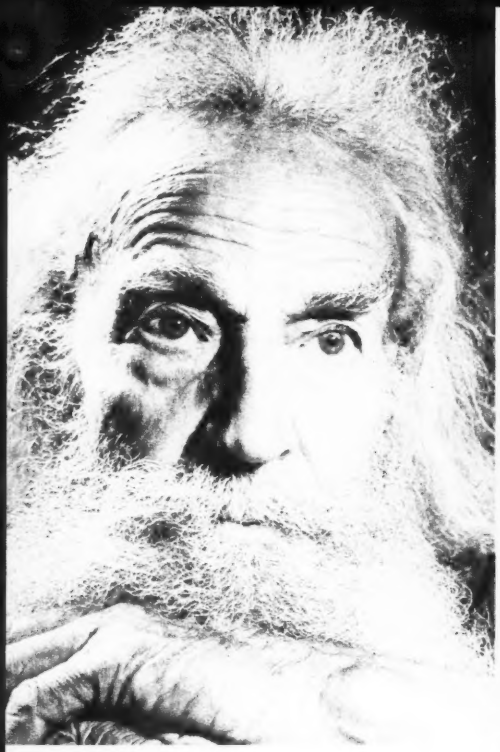
See-saw is made in two separate units, thus simplifying storage.

Note bracing on the support unit. The outriggers prevent tipping.









1st Prize ($10.00) .....The Patriarch
Taken by Arthur Adams of Whittier, Cal., with a 4x5. Two No. 5 lamps, one at back of subject.

$5.00 Award .....Summertime
Eva Kretschmer of Rochester used a 4x5 Graflex to record this scene. Super XX, 1/50th at f-8.

Monthly Photo Contest

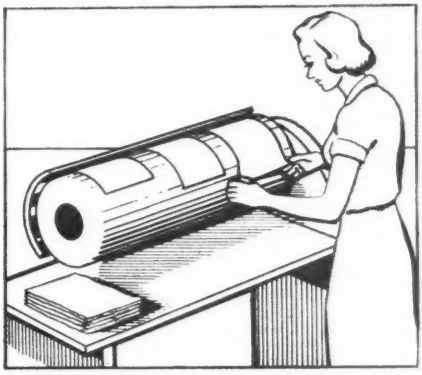
Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Please address your entries to: Monthly Photo Contest Editor, MECHANIX ILLUSTRATED, 67 W. 44th Street, New York 18, N. Y.

$5.00 Award .....Bailing Out
Taken by R. E. Hancock of Portsmouth, Va. Leica camera and Plus X film; yellow filter, early morning

$5.00 Award .....Sunset
Graflexed by Leon Cantrell of Nashville, Tenn. Pan film, G filter, 3¼x4¼ film, DK 50 developer.

photo kinks

Pure Water. If your tap water is not pure enough for preparing photo solutions, use the water collected from your refrigerator after it has been defrosted. Filter it before using.

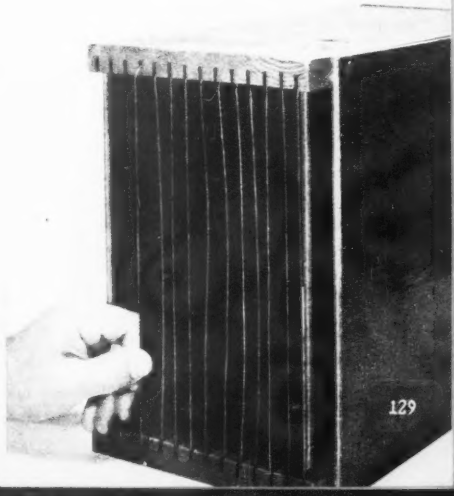


Flower Holder. Cut flowers may be held in the proper positions for indoor photos by the use of a stiff scrub brush. The stems can be inserted between the tufts. Cover brush with some sod, moss, or leaves before taking the actual photograph.

Ferro Rack. Instead of piling your ferrotype tins in an old envelope, make a garage for them. This one was made of common 8 in. shelving and grooved on the circular saw. The slots are ⅜ in. deep and spaced the same distance apart.

Print Drier. The automatic iron in addition to ironing sheets will also do a good job on your prints. Take up excess moisture first; use low heat.

Solution Storage. Large pickle jars make good containers for storing your photo developers and fixers. Covers should be lined with wax paper.



Do you like this effect? You can do the same by means of inexpensive Rit or Tintex fabric dyes.

Tint Your Pictures

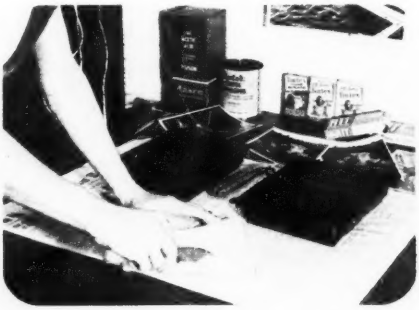
By Paul J. Howe

HAVE you ever wished you could add a certain color to a print in order to portray a particular mood? Toning is the commonly accepted procedure. But, the chief drawback with toning is the limited number of colors available. How would you like to tint your pictures in any color of the spectrum? Dye tinting is the answer.

Go to your nearest drug store or dime store and purchase a package of Tintex or Rit dye. Make sure you get the exact shade you want and make certain that it is the type which tints rayons and acetates.

Mix one level teaspoon of the dye to 5 oz. of water. Heat this solution to just below

1. First step consists of masking off the borders of the print so they will not be affected by the dye.



2. Use Scotch tape and rub it down thoroughly. The back of a table knife makes a good tool for this step.

5. An electric hot plate is ideal for keeping the dye at the recommended temperature of 120°.

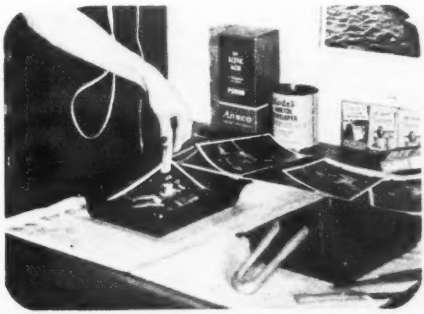
6. Soak the print in "white" gasoline to remove the Scotch tape. Caution, do this operation outdoors.

Always select a print whose mood will "fit" the color of the dye you are planning to use.

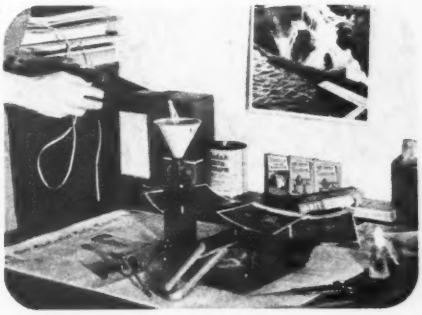
the boiling point and then set it aside to cool. This solution should be used at about 120°F.

If you do not want the border of the print dyed, it should be masked with Scotch tape. Then immerse the print in the dye solution and keep it there until it is just a little bit darker than the color you want. This is necessary as some of the dye leaves the print when it is rinsed in running water. Dry the print in a blotter roll. Avoid excessive heat when drying the prints. It is best to let them stay in the blotter roll overnight.

You can dye several prints at once, but, if you find that your solution has cooled, it should be reheated to 120°. This is necessary as the dye does not seem to "take" at a lower temperature. •



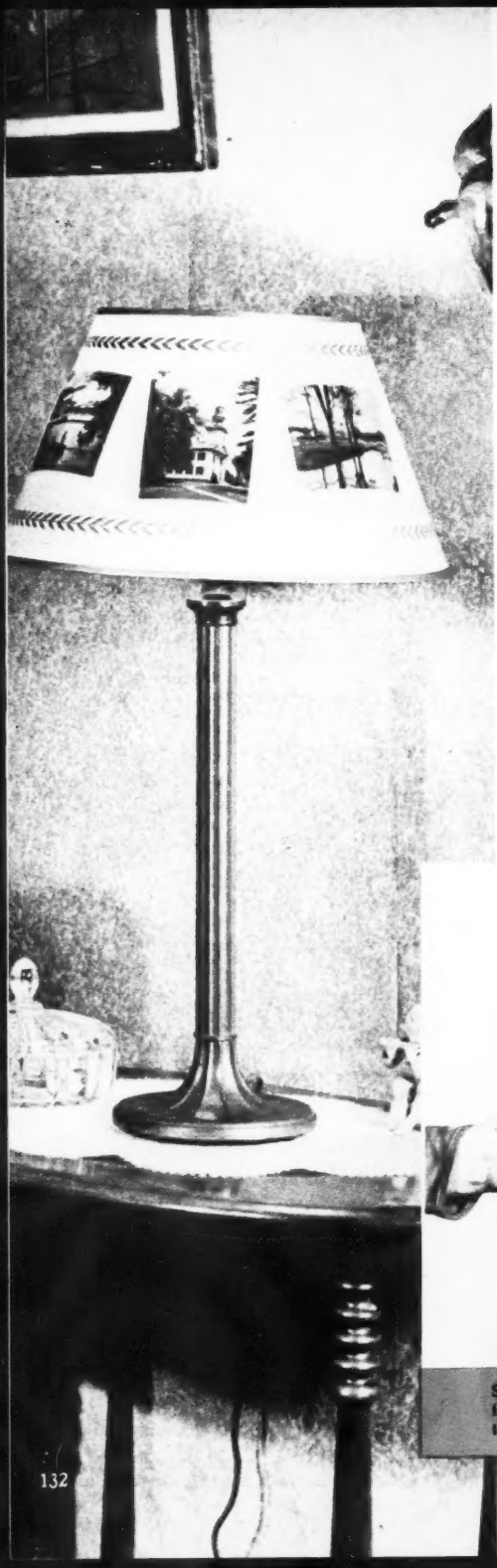
3. Immerse the print in the dye until a slightly stronger tone than that which is desired is obtained.



4. To dye a second print, the solution must be poured back into its storage bottle for reheating.

7. After a brief soaking the tape can be easily removed from the prints. Use cotton to remove gum.

8. The finished print. Practically any color in the spectrum can be used. Save the dye for future use.

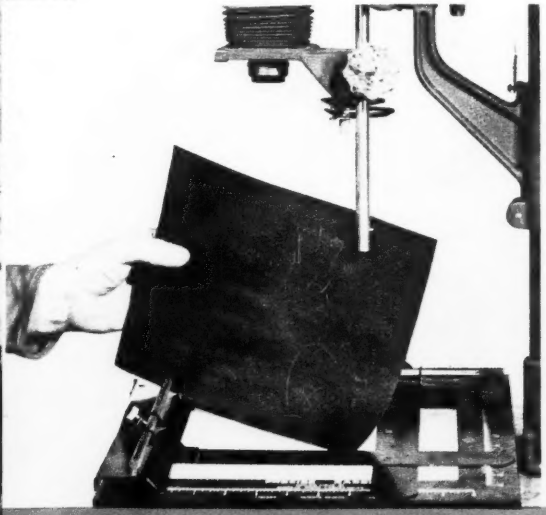


PICTURE LAMP SHADE

HOW often have your neighbors and friends given your pictures a desultory look and then remarked, "H'm, you must have a good camera." Obviously overlooking the time and effort you may have spent to take the pictures, to say nothing of the ability required.

If you really want to awaken your visitors and have them examine and admire your work with the unflagging interest which it undoubtedly deserves, try Eastman's Translite film for a few of your prize negatives.

Translite is a special kind of film with a sensitive emulsion on each side. The base itself has a sort of



Sheet of black paper should be placed on easel before inserting the Translite film. This is necessary to avoid light reflections from white surface.

Try decorating; your subjects are sure to light up when displayed in this novel manner.

By H. Leeper

ground glass appearance. The film is not notched; either side is the right side. This film is designed to be viewed by transmitted light; in other words, the light must shine through it, not on it.

Use the film as you would an enlarging paper. However, one precaution must be observed. Your easel should be backed with a piece of black paper in order to prevent reflections from its white surface from fogging the film. It has about the same speed as Vitava Opal enlarging paper. Fine grain developing is not necessary. You can use D-72 or any comparable developer.

Inasmuch as different grades of contrast are not available in this emulsion, it is best to use a negative of average contrast in the enlarger. After the film has been in the developer for the recommended time, view it against a white surface, such as an enamel tray. Use a Series OA safelight to avoid fogging. At this stage, the transparency will have a slightly cloudy appearance which will clear in the fixer. After the customary washing the film can be dried in a cut film hanger.

The actual mounting of the Translite film in a lamp shade is comparatively simple. Cut an opening in the shade about ¼ in. narrower, at top, bottom and sides, than the transparency you are going to use. The transparency should be mounted on the inside of the shade. Tack it into place by means of a few dabs of Duco cement.

The best type of negatives to use are those having rather large masses for subjects, such as trees, buildings, animals and large heads. Try to arrange your transparencies in some sort of a pleasing order before cutting the openings in the shades. Don't forget that you can flop the pictures from left to right in order to get the best possible composition. A good rule to follow is to have the action, if there is any, or the direction in which the subject is looking, follow around the lamp shades in one direction. From left to right or right to left; it doesn't matter which way as long as the "action" is continuous. Avoid small transparencies. The minimum size for best viewing is at least 4x5 in. •

Use a white enamel tray as a background for viewing the Translite film. The film will have a slightly cloudy appearance which clears in the fixer.

After fixing the films may be replaced in cut film hangers for drying. Translite film has about the same speed as Vitava Opal enlarging paper.

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*Copr. 1949, Easi-Bild Pattern Co.

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Makers of Casco Glues

McCahill Predicts

[*Continued from page* 87]

inspected their entries from fuel cap to exhaust pipe.

The first of these stops was at Lou Meyers' plant. Lou is the president of Meyer-Drake Engineering, builders of the famous Offenhauser engines. Lou is also the only man, with the exception of Wilbur Shaw, who has ever won the Indianapolis race three times. (Mauri Rose, '41, '47 and '48 winner can't be counted for the full three as he split the '41 race with a co-driver.) Every time I'm in California, I manage to get out to Lou's plant because this is the true Tiffany of the engine business. More than 90 per cent of all the engines in the race will be his. Then, too, Lou has a sort of fatherly relation with the Bud Winfield cars because he made the original Novi engine block from Bud Winfield's designs and patterns.

"Who's going to win?" I passed on the question. His answer shows the kind of a sportsman Meyer is, because the Winfield engine is not really his. He said, "If Bud has the Novis going right, they'll beat anything in the world!"

My next call was to see Lou Moore, designer and builder of the two cars which finished first and second in '47 and '48. Moore is building another car this year, to be powered like the other two—by a four-cylinder Offenhauser without supercharger. He gets his cars ready months in advance and then, like clock work, they go out on the track, qualify and go back under sheets until it's time to get out and win. Moore is not one of those operators who wears his cars out by tune-ups and trials days before a race.

"Do you think you can make it three in a row?" I asked him. He smiled and said: "We're going to try."

At the Kurtis Kraft factory I found everything in high gear. Frank Kurtis, like Lou Meyer, has an interest in nearly every car as he is the top builder of frames and bodies for the race trade. Frank will have his own personal car running, the one that finished late in the money (ninth) last year. Since then he has made quite a few changes in its suspension and with Johnnie Parsons as chauffeur, he should be closer to the leaders.

Mel Ord is not planning to bring the Hitler Mercedes back for another try for its owner, Don Lee of Los Angeles. The big Merc presents too many problems in engineering especially since there is no ready supply of parts available. At the moment, he's planning to enter only one car—the Don Lee Kurtis Kraft which finished fifth in '48.

[*Continued on page* 136]

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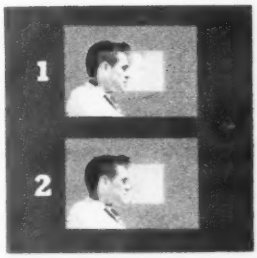
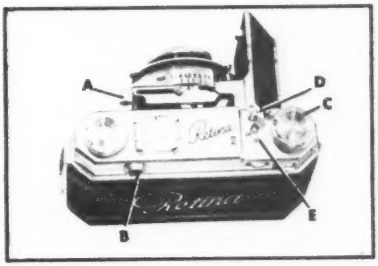
New all-in-one view and range finder. Figure **1** shows subject *out of focus* with two images in the center area. Figure **2** shows subject *in focus* with one image superimposed on other.



Finger-tip operation means easy control of the camera and a better picture on every shot. **A**, focusing knob; **B**, single view-and-range-finder window; **C**, film-wind knob (with automatic film stop and double-exposure prevention); **D**, shutter release; **E**, automatic exposure counter.



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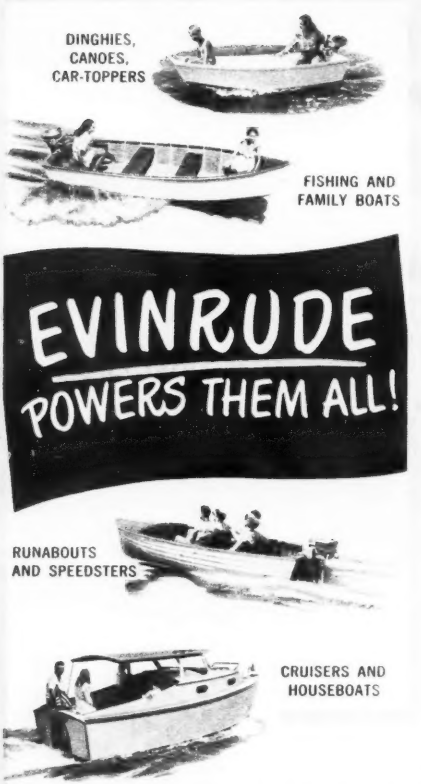

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McCahill Predicts

[*Continued from page* 134]

I phoned Wilbur Shaw in Indianapolis to find out if there were any late or unexpected entries. He told me that the Maserati which Luigi Villoresi drove in '46, later purchased by Cotton Henning, had been entered. This car proved remarkably fast when it finished seventh in 1946 despite spending more than 30 minutes in the pits with magneto trouble.

But now, let's visit the coming winners!

Take the world's greatest engine designer and builder—Winfield, add the fastest cars in America—the two Winfield Novis, and then throw in the finest mechanic with the most outstanding record in racing history (four winners at Indianapolis)—Jean Marcenac. There you have an almost unbeatable combination. As if that weren't enough, place in these cars two of the best drivers in the country—Rex Mays and Duke Nalon. How can you lose?

Rex Mays, known as Leadfoot Mays for many years on the top tracks, is one of the best. He's never won the big classic although he has finished second twice and has had the pole position four times on the brickway. Last year he shot ahead and led the pack in the time-worn Maserati for nearly 50 miles. Then his car started to give way but he kept it going for over 300 miles at which time he had to quit because of a leak in the gas tank. He was still running fourth, though. Mays is a great driver and his big trouble to date has been that the cars he has driven have not been tough enough for him.

Will the great Novi stand up to him? The car he's going to drive is the original Novi, holder of the track record of 134 mph made by Ralph Hepburn in qualifying for the 1946 race. This is the same car in which Hepburn was killed last year while doing 130 in practice. The engine is about all that was salvaged from that tragic wreck so this Novi is practically a new one. If it can stand up under Mays, he's the winner for sure as either Novi is capable of spotting any other car on the track 50 mph on a straight run.

However, my money will be riding on colorful and popular Duke Nalon in Novi No. 54, identical twin of Mays' car. Nalon has proven himself a smart money driver and had last year's race sewed up when he ran out of fuel because of incorrect filling at the halfway mark. The car had a new-type tank and the fuel formed air bubbles which gave the man handling the hose the impression it was full when it was really less than three-quarters filled. This forced Nalon to come into the pit again for a refill at 462 miles when he was

[*Continued on page* 138]

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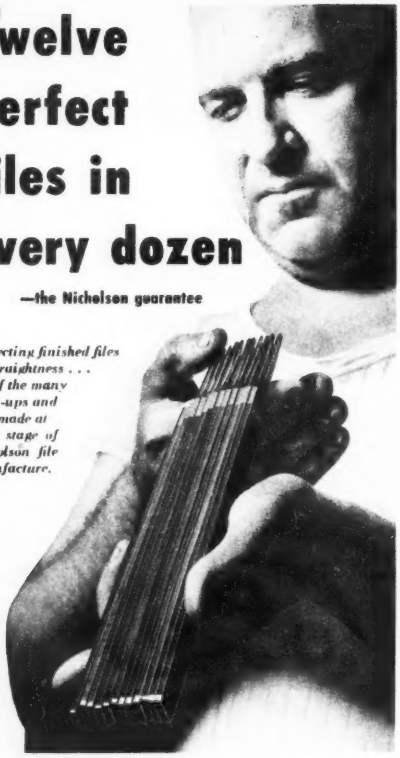

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McCahill Predicts

[*Continued from page* 136]

trailing Mauri Rose by only 21 seconds. With the extra speed of the Novi, Nalon was set to take Rose and would have walked away with the big cup—as it was he finished third. This year Winfield will do the refueling himself. The new self-sealing tanks are larger so it won't be a case of gas shortage if the boys fail.

Winfield's biggest trouble was in finding magnetos that would stand the gaff of those engines. For three years he has been plagued with mag trouble so this year he elected to build his own. When I saw them being tested, they threw a spark like a Westinghouse lightning exhibit. With the new magnetos, the Novis are at last 100 per cent custom built right down to their special spark plugs. This team now represents close to a half-million dollars so there will be no profit even if they finish first and second.

I pick Nalon because he has all the guts in the world. He proved that when he drove the Hitler Mercedes two years ago and kept it going for 50 miles while being sprayed from head to toe with hot oil from a broken line. I saw this and will never forget the beating he took. When he was finally ordered off the track, he looked more dead than alive but he asked Ord, "Can you fix it?" Nalon made the fastest qualifying time last year with his No. 54 Novi —131.5 mph. This meant doing 180 plus in the stretches. And brother, that's driving in any league!

One of Winfield's cars will win or there just ain't no justice. This is the greatest combined team ever to descend upon the Indianapolis clambake.

So, to make my prediction entirely clear, here's the way I call 'em after a month with the greatest race men in the world. First—a Novi Governor, most likely Nalon's No. 54; second—a Lou Moore car, Rose top choice. I admit this is giving me a four-car choice for two places but, as it's my neck, please grant me a little liberty.

I pick Bill Holland, driving a Moore car, or Rex Mays, in a Winfield car, for third place. Next, I'll take the Don Lee Kurtis Kraft; the Walsh Kurtis (the new rear-engine job, Novi type with 270 Offenhauser engine); and George Connors driving Lou Moore's new car.

The safest bet in this race is that both the first and last car to finish will be using Firestone tires—they all use 'em. Whatever the outcome, despite my predictions, this Indianapolis race will remain one of the biggest and most colorful sporting events in the world.

NOTE TO EDITOR: *Next month, just make out my check to Mr. Mud.* •

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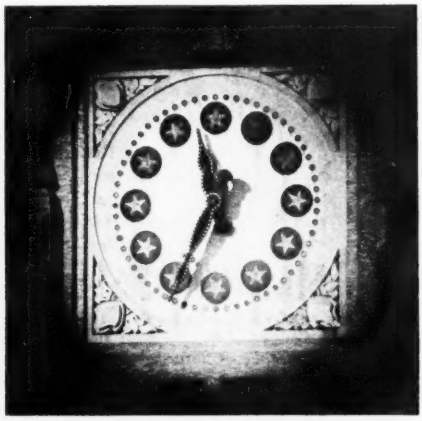
The Amateur Telescope Maker's Page

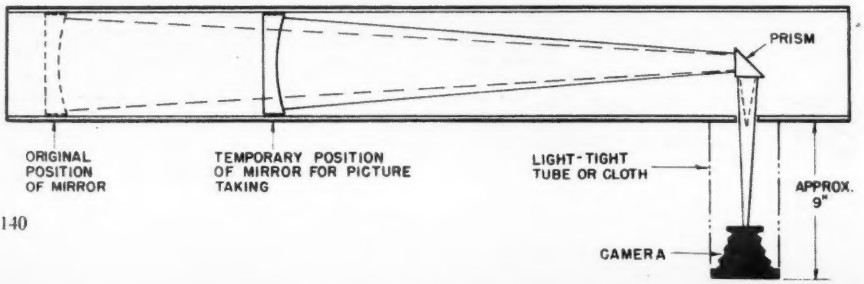
Conducted by Robert Brightman

AT first glance, the two pictures below appear to have little in common. However, if you will take a second look, you will notice that the picture at the right is a close-up of the clock which appears in the center of the building. *It is not an enlargement.* It was taken through MI's Portable Six-Inch Telescope with the set-up shown at the top of this page.

Most Big Bertha cameras used by sports



This is a reproduction of the actual photo taken with a normal 5-in. lens on 3½x4¼ film. Picture at right shows the tremendous magnification obtained with a 54-in. mirror.



photographers have lenses with focal lengths varying between 28 and 40 in. This picture, however, was taken without any lenses. A mirror with a focal length of 54 in. was used to yield a magnification of about 10 times. *No enlarged picture, or image made with a telephoto lens can compare with the quality and clarity of a picture made by a true long-focus lens, or, as it happens to be in this case, a mirror.*

Remove the eyepiece adapter, the eyepiece and the camera lens. Use a ground glass and shift the camera back and forth behind the hole cut in the tube for the eyepiece adapter until the image is sharp on the ground glass. A Speed Graphic is ideal as its self-contained focal plane shutter will enable you to make the correct exposure. The space between the telescope tube and the camera body should be well swathed with a black cloth.

Inasmuch as our mirror has a diameter of 6 in. and a focal length of 54 in., it has a value of f-9.0. The picture was taken at a shutter speed of 1/200th of a second with Super XX film. The actual image will be just about as large as the face of the clock shown on page 138. Note the difference in the time between the three clock dials. This is accounted for by the time required to take the various pictures. They were all taken from the 20th floor offices of MECHANIX ILLUSTRATED in the Fawcett Building in New York City. •

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TELESCOPE CLASSIFIED
See Page 54

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MI Tests '49 Chevrolet

[*Continued from page* 85]

gears and remarkable hill-climbing ability. Chevvies get in trouble, though, when they fall into the hands of a speed maniac or a stupid road hog who refuses to let anybody pass, even on long stretches.

I've seen Chevvies driven murderously for miles across hot prairies at 80-plus. And I've seen many of these same Chevvies stalled on the roadside with hoods up because they were beaten to death.

One of my closest friends, an old engine man from way back, has been a Chevrolet fan for years. Winter and summer, he makes a weekly round trip across the hot desert from his home in Phoenix, Ariz., to Los Angeles, 400 miles away.

Here's what my friend, who's now driving his ninth Chevvy, has to say about them and high speed:

"Drive them all day long at 68 miles an hour and they'll last forever. But just get to 69 and keep it there and you can make book on whether you'll burn out a bearing, throw a rod or lose a timing gear. It will be one of the three."

Now, don't get the impression that you will ruin your Chevrolet if the Barney Oldfield in you gets the upper hand at times and you drive it wide open for a mile or two. You won't do any appreciable damage this way. But take it easy on 160-mile stretches like the Pennsylvania Turnpike. If a steady 68 isn't enough speed for you, take to the airlines. Naturally, all this is based on Chevrolets up to now, but these statements will still stand in '49 since the engine is basically the same one, and with the same characteristics, that Chevrolet has been using for many years.

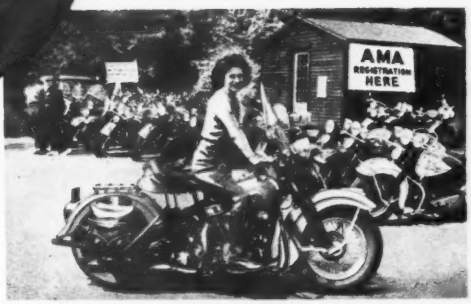
So much for the minus side.

Now for the plus. If you're a sane driver and owner, your Chevrolet will go on and on for years like a grandfather's clock. The Chevrolet is by far the best handling car in its class. Where roadability and curve hugging are concerned, it will run any of its present competitors right off a cliff. It's a smooth-riding car on the highway but far from exceptional on rugged country lanes. The steering is tops in its price field. So is the driver's leg room. Accessories like pedal rubbers, and rugs also are the best.

For my test in Southern California I selected the four-door Styleline De Luxe sedan. First, I headed for the mountains which are as easy to find around Los Angeles as balls in a bowling alley. As soon as I reached some tough grades, I started giving the Chevrolet the works. Chevrolet, of course, has no Dyna-

[*Continued on page* 144]

Every day is fun day



EVER ride on a cloud? Ever wish you had a motorcycle that would give you that feeling? Well, brother, here it is . . . the 1949 Harley-Davidson with the Hydra-Glide Fork! Glide is a *mild* word for it! Never before has such riding comfort, steering ease and roadability been built into a motorcycle. You *float* over bumps, *skim* over rough roads, *sail* down the straightaways, enjoy every mile as never before. Even on longest trips, you're fresh as a daisy, ever ready for fun as you take in exciting race meets, endurance runs, hillclimbs, gypsy tours, sightseeing trips. Try a glide-ride and be convinced! See your Harley-Davidson dealer today. Mail coupon now.

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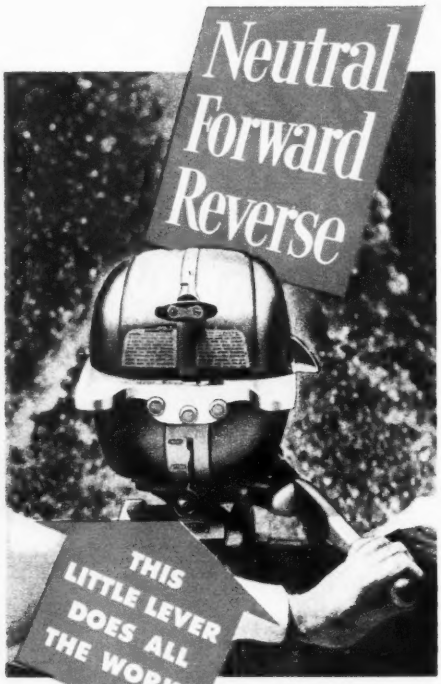

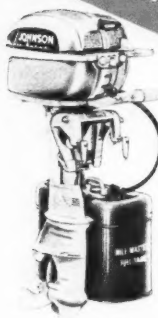

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You operate it by Gear Shift Control. Move the knob (shown above) and go from Neutral to Forward or Reverse. It's so easy!

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JOHNSON SEA-HORSES
for DEPENDability

MI Tests '49 Chevrolet

[*Continued from page* 142]

flow, though it does have an overhead-valve engine like its big brother, the Buick.

On one pass where I climbed 3000 feet, the road weaved up the mountain's face like a snake—hard left, hard right, 200 feet of straight grade, then hard lefts and rights again. My foot was flat to the floor all the time but the Chevrolet took to these merciless curves as if it were rolling along a grooved track. At the summit I took a breather, then turned around.

On the way down, I really burned rubber. After making sure everything was buttoned up tight, I prayed that the boys at the factory did their jobs well, because I was hitting unguarded curves on the outside with tires screaming. One slip and the next stop would be some 2000 feet below.

The Chevrolet held those tough curves like an English M.G. and that's tops (see MECHANIX ILLUSTRATED for January, 1949).

The mountain tests over, I headed for the Pacific and some straightaways. For my more technical readers, the barometer was 30.1 inches, the temperature 68 degrees Fahrenheit and the runs were made approximately 12 feet above sea level. The wind was flatter than Joe Stalin's head.

The stop-watch results of many test runs shaped up like this:

10 to 60 in high gear	19.0 seconds
0 to 60 through gears	16.8 seconds
30 to 60 in high	11.7 seconds

Top speed I had to forego. On the measured-mile stretch where I was working, the California highway patrol started taking more than a casual interest in my activities. In fact, they hailed me to one side and asked, "What cooks?"

Now, as I was driving a California car with a New York operator's license, I was not in an ideal position to dicker. As a strictly barnyard opinion, backed by some Chevrolet tests of a year or so ago, I feel the top Chevrolet speed is about 87 or 88 mph.

As stated earlier, the power plant is identical with those of former years, except for some very minor changes involving timing gear, lubrication and spark plugs. The Chevrolet engine is a valve-in-head job that develops 90-hp with six cylinders and a 6.6-to-1 compression ratio. Pistons are cast alloy iron. Wheelbase 115 inches, overall length 197 inches, including bumpers.

Unless you're a rough-riding speed hound, you can't go wrong with the new '49 Chevrolet. In the low-price range, you still won't find a better bargain in family buses anywhere in America. •

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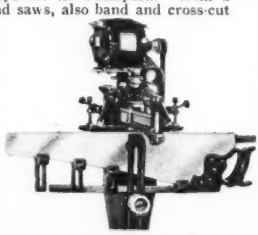

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Do Truth Drugs Work?

[*Continued from page* 58]

George T. Davis, his defense attorney, produced a surprise that rocked the courtroom—a wire recording of an interview held the night before in Long's cell, between the defendant and a psychiatrist. Before the interview, the psychiatrist had given Long an injection of pentothal.

The courtroom was hushed as Kenneth Long's recorded voice came forth in soft, faltering tones. He had flown home from an Alaskan base, his voice said, because Barbara had written that she wanted to divorce him. When he arrived home, she told him she was in love with another man, and didn't know whether her lover or Long was the father of her second child.

"So I got down on my knees and prayed to her," Long's recorded testimony continued, ". . . and asked God to come to us. Then I went to the kitchen door. . . .

"*The knife!*" Long's voice sobbed frantically.

"He came out of the bathroom with a butcher knife," the recording spun on. ". . . She said:

" 'Kenneth, he is going to kill you. He's going to get you out of the way so we can have happiness.'

"And he said to Bobby:

" 'I don't know whether to kill him or not.'

"He killed my wife," Long's voice cried. "I saw him kill her. He stabbed her twice."

Long himself had been unaware of this startling revelation by his subconscious mind under the influence of the pentothal "truth serum." He was as stunned as the court at this amazing confession.

Later, it was indicated that the man Long thus accused of the killing was William Peck, a neighbor. The pentothal testimony convinced the jury that Long had revealed the truth about the murder. But Peck established an alibi that he was with another woman and her husband at the time of the stabbing.

So, for the first time a truth drug helped a defendant confess not guilt but his own innocence by recalling an event so shocking that it caused him to forget everything that happened during the night of the crime. Yet, since the new suspect also proved that he did not commit the murder, the truth drug worked only half well—and this killing that at first looked like such a plain case of murder remains an unsolved mystery.

In earlier cases, though, pentothal and its chemical cousin in the barbiturate family, sodium amytal, have exposed the most carefully guarded secrets and made the subject

[*Continued on page* 148]

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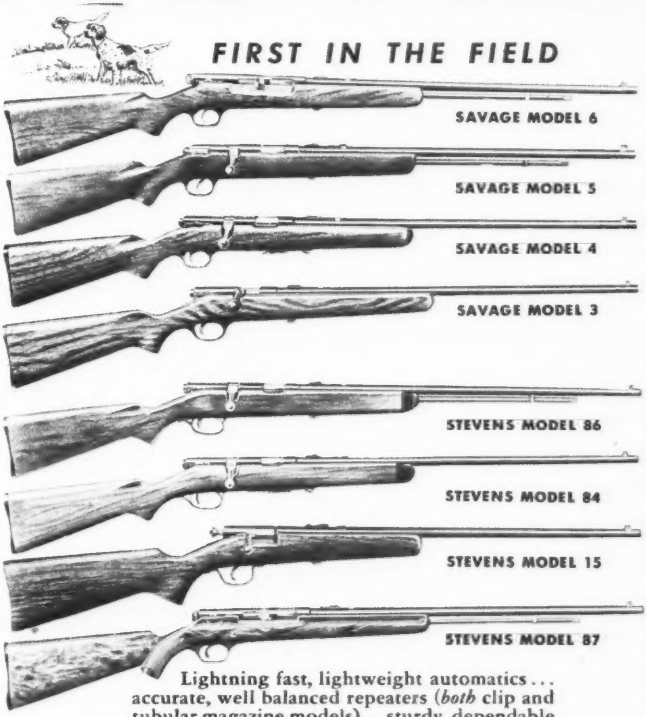

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Model 86 — .22 cal. Bolt Action Tubular Magazine Repeating Rifle. Magazine holds fifteen .22 long rifle; seventeen .22 long or twenty-one .22 short cartridges. Military style stock with pistol grip.

Model 84 — .22 cal. Bolt Action, Clip Magazine Repeating Rifle. Detachable clip holds five .22 long rifle; .22 long or .22 short cartridges. Self-cocking, bolt action. Independent safety.

Model 15 — .22 cal. Bolt Action, Single Shot Rifle. Chambered for .22 long rifle; .22 long or .22 short cartridges. The lowest priced lightweight "22" in the field.

Model 87 — Semi-Automatic .22 cal. Rifle. Shoots 15 shots as fast as trigger can be pulled. Also, instantly adjustable as single shot or bolt action repeater, shooting .22 long rifle; .22 long or .22 short cartridges.

Stevens Models 86S - 84S - 87S; same as above with No. 150 Micro Peep Sight with Hooded Front Sight illustrated above.

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Model 6 — .22 cal. Auto-Loading Rifle — shoots fifteen long rifle cartridges as fast as you can pull the trigger. Also, instantly adjustable as bolt action repeater; shooting .22 long rifle; .22 long or .22 short cartridges.

Model 5 — .22 cal. Bolt Action Tubular Magazine Repeating Rifle. Magazine capacity — fifteen .22 long rifle; seventeen .22 long or twenty-one .22 short cartridges.

Model 4 — .22 cal. Bolt Action 5-shot Clip Magazine Rifle. Chambered for .22 long rifle; .22 long or .22 short cartridges. Stock and forestock of walnut.

Model 3 — .22 cal. Single Shot Bolt Action Rifle. Shoots .22 long rifle; .22 long or .22 short cartridges, regular or high speed. Positive safety. Walnut stock and forestock.

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Do Truth Drugs Work?

[*Continued from page* 146]

"sing" more quickly and clearly than any third-degree torture chamber.

Three years ago Chicago police arrested William Heirens for the kidnapping and sex murder of little Suzanna Degnan. Day after day, detectives questioned him in the hospital prison ward—and got nowhere. Heirens kept insisting that he was innocent. He challenged the investigators to test his story by any means that they wished. He was so sure of himself that he agreed to be examined while he was under the influence of a truth drug.

Dr. Roy R. Grinker, Army Air Force medical officer who pioneered in developing truth drugs with his colleague, Major John R. Spiegel, as an aid in treating combat fatigue, came to the ward to give Heirens an injection of sodium pentothal.

Now, using the technique of hypnotic suggestion, the doctor told Heirens that he was with the Degnan child, at the scene of the brutal crime. Dr. Grinker urged the youth to tell what happened. Heirens twitched convulsively and his hands seemed to grope for support in the air. His eyes opened and the pupils dilated. A fine sweat beaded his forehead. His body grew tense and rigid. He began to talk rapidly, with increasing agitation.

Before he stopped, Heirens gave a full account not only of the Degnan killing but also of other crimes, of which no one had suspected him before. His blustering defiance collapsed completely under the truth drug and gave way to a detailed confession of all his secret crimes. His warped conceit had convinced him that he could resist the effects of the drug and thus strengthen his defense.

Pentothal is by no means 100 per cent effective, even in criminal cases. Some people can successfully resist the tongue-loosening effect of the talking needle and keep their inner thoughts securely concealed in their subconscious—as Heirens *thought* he could do. Others sink into the silence of deep sleep.

In another notorious murder case in which the talking needle was used, the question of consent was not involved. This was the case of the "Mad-Dog" Espositos, brothers Anthony and William. For an entire year after they were convicted of killing a paymaster and a policeman, the Espositos refused to utter a word. In the death house at Sing Sing, they grunted, snorted, crawled on hands and knees like animals, or "froze" in rigid positions for hours at a time.

These actions might have been symptoms of schizophrenia, or split personality, the most prevalent type of insanity. Or they might have

[*Continued on page* 151]

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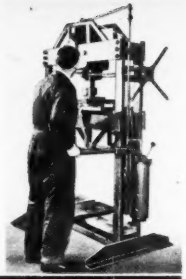

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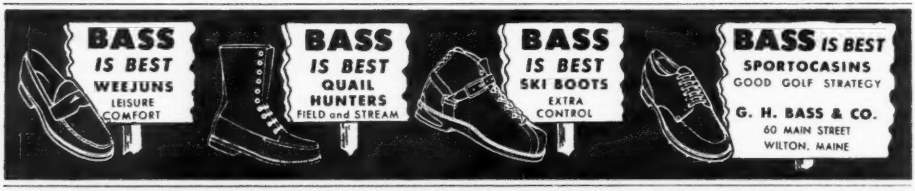

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Do Truth Drugs Really Work?

[*Continued from page* 148]

been faked all along in the hope of escaping the chair. What was the truth?

Dr. Ralph S. Banay, then chief psychiatrist at Sing Sing, sought the answer by testing the Mad-Dog brothers with a truth drug—this time sodium amytal plus benzedrine sulphate, a stimulant to avoid too deep a trance. For the first time in a year, the Espositos talked. But they talked and acted like babies and started crying for their mother.

A retreat to the security of childhood is characteristic of insanity, especially schizophrenia. Dr. Banay concluded that the drug had merely accentuated this symptom in the Esposito brothers and that they were genuinely insane.

Another psychiatrist, though, was convinced that the brothers had a constitutional resistance to the truth drug and were still only feigning insanity. His verdict was accepted and the Espositos were executed.

Because of their ability to strip away the defenses of the conscious mind with almost magical speed, sodium pentothal and amytal have helped a new technique in psychiatry, narcosynthesis. The talking needle thus enables a doctor to get at the heart of a deep-seated emotional trouble immediately, instead of going through weeks or months of laborious examinations.

Truth drugs do have an amazing power for unlocking secrets buried deep in the subconscious mind. In criminal investigation, as we've seen, the probings of the talking needle sometimes upset the court of justice as well as the accused. The emotional scenes conjured up from the subconscious during a truth-drug trance are not the mere fantasies of dreams or hypnosis but reveal the truth about what really happened.

In the hands of unscrupulous people the talking needle can be turned into a dangerous weapon against democracy. Few psychiatrists believe that narcosynthesis should become a general procedure in dealing with all neurotic cases, even when there is no crime involved. But, properly used by medical experts, the truth drugs can frequently eliminate exhausting months of psychiatric interviews by exposing the most secret emotional troubles—and work wonders in restoring not only memory but a more normal way of life. •

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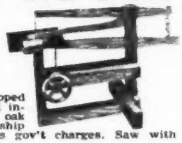

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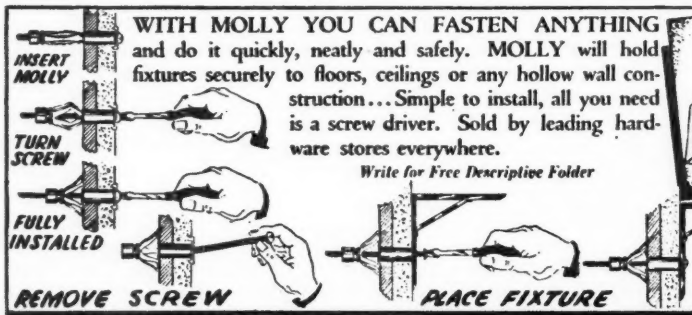

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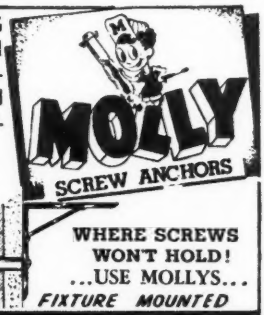

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Radio Diagrams

[*Continued from page* 117]

Its schematic symbol is therefore a zig-zag line, to indicate a difficult path (See Fig. 1). If the resistor is variable in value, as in the case of a volume control, a small arrowhead is added to represent a movable contact. For identification in parts lists, specifications, etc., resistors carry the designation R, followed by numbers in sequence.

Condensers in various forms consist of plates, made of some good conducting material such as aluminum, brass, copper, tinfoil, etc., which are separated by an insulating medium such as air, paper, mica, cloth, etc. There must be no actual contact of the metallic surfaces. The plates are thus represented in the schematic symbol as two close, parallel lines, separated by a little white space. If the condenser is variable, an arrow is run diagonally through the plates. The letter symbol for condensers is always C.

Coils of wire of all types are shown graphically by a series of curlicue loops. Two or more coils wound near each other or over each other on the same form constitute a transformer. If the form or "core" is air or some other insulating material, the coils are drawn close together with a little white space to indicate the "dead" core. The tuning coils commonly used in receivers and transmitters are in this classification, and are properly known as "radio-frequency transformers." If the coils are wound on heavy iron frames, they are intended for use on lower frequencies of alternating current, and three solid lines are drawn through the loops of the symbol, or next to them, to represent the iron core. Power transformers, amplifying transformers, loud-speaker output transformers, doorbell transformers, train transformers, etc., can all be shown by the identical symbol. The winding through which the current is applied is called the "primary"; the winding from which it appears is called the "secondary." Transformers with a single primary and multiple secondaries are common. The power transformers used in most radio receivers have a primary connected to the 110-volt house line, and usually three secondaries: two giving low voltages of 5 and 6.3 volts for lighting the tubes of the set, and the third developing between 500 and 600 volts for the plate circuits of the tubes.

Single coils of wire, with or without cores, are known technically as inductors, but more usually as "chokes" because they tend to oppose the passage of alternating current. The letter symbol for coils is L; for transformers, T.

[*Continued on page* 156]

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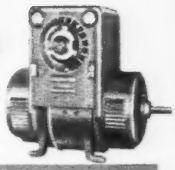

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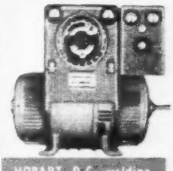

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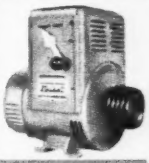

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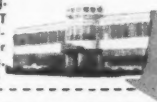

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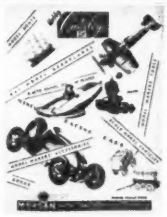

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[*Continued from page* 77]

to run a bait-and-tackle stand in the front, rent a little additional space in the 60- by-100-foot building for a food counter.

"You could have the rest of the place for a small-boat showroom," Parlato told Cochran. "You've always said you wished you could find a good spot for one. You can pay me part of the profits. I'll help you fix up the place, and so will my brother, Salvatore."

Even with the Parlatos helping, it took until June to get the building, unoccupied for five years, into presentable shape. Cochran was appalled at the high price of lumber. He got a break, though, when Parlato found a broker of hotel supplies who'd just bought six tons of dishes at auction but had no place to store them. Parlato suggested that the broker use his building as a warehouse.

"For rent," Parlato said, "you can give us the crates the dishes are in."

As the dishes were sold, Ralph and the Parlatos ripped the big boxes apart and used the wood for shelving and counters, puttying in the glass for showcases themselves. They had enough wood left over to fence off a small office for the showroom.

Though the building was far from ready by March, Cochran sold his cabin cruiser then for $1800 so he could buy stock.

The biggest bump came when he discovered that he could not get a franchise to sell any "name" brand boats or motors in the territory.

After trying in vain to reach small-boat builders by newspaper advertising, he spent $30 to have 5000 circulars printed. He got everyone he knew to distribute them.

The result was fantastic. No small-boat builders responded. The widely circulated throwaways, though, made four distributors of "name" craft offer to stock his showroom with models. He could sell their line on a 50-50 basis, the distributors said, if he'd abandon the idea.

"I agreed readily enough," says Cochran, "because there was nothing to abandon. In no time at all I had 18 boats—speed babies, inboards, dinghies—and plenty of motors."

Cochran does his own repair work and has set up a clinic in the building to give first aid to failing motors. He saves hauling charges on boats by bringing them into his showroom on his trailer. His wife helps him with the selling and does the office work.

By last November, Cochran had so firmly established himself as a sound businessman that he got a New York bank to finance his purchase of $19,000 worth of outboard motors.

The Mercury, a new outboard motor that Cochran believes in, moved slowly at first

[*Continued on page* 160]

MI's Whirlaway

[*Continued from page* 100]

at this point and cover the entire fuselage with Silkspan tissue, doped on. Put the motor back in and allow the whole structure to dry.

When dry, sand the wings and tail down or at least round off the leading edges. Then fit the support arm which is glued to the under side of the wing and is flattened where it bears on this surface. Remove the motor and solder the No. 30 enamelled wire leads to the terminals. Replace the motor and run the wire leads out along the underside of the wing and cement them in place to the wing tip. Allow sufficient wire to extend well beyond the pylon center. Residue can be snipped off later. Make the five-inch diameter propeller from a piece of flat aluminum, attaching it to the soft balsa spinner as shown in the drawings. Now comes the only part of the job which requires precision work. Bend the axial post or shaft from a length of $\frac{3}{32}$ in. piano wire. The part that revolves in the pylon must be straight and true. The end that fits into the support arm tube projecting from the wing tip of the plane should be filed down to a tight fit into the tube. Later this will be soldered fast but first there is the matter of the collars to be attended to. These can be lathe turned from brass and drilled and tapped for the set screws or, should you lack lathe facilities, purchased from most model stores. The collars MUST be insulated from the axial post. This can be accomplished with fiber or plastic ferrules or, as in the case of the experimental model, by simply wrapping scotch tape around the axial post at the point where the collars are to be attached. Solder the enamelled wire leads to the collars after scraping the ends down to the clear wire. Now place the post in the tube which is mounted in the pylon and adjust the copper brushes so they press evenly and firmly against the collars. The brushes should be fairly stiff; don't worry about friction. The plane has plenty of power to offset any ordinary friction. Now place the plane in position and adjust for longitudinal trim. When in just the right position solder the support arm wire into the support arm tube. This is a simple sweating operation and takes a second if parts are clean and the iron hot.

Now bend the support arm tube to any desired bank. Put in the batteries taking care to link them in series as you would in an ordinary flashlight. Turn on the switch and stand back. If you find to your horror that the plane goes backwards don't worry. Just reverse the battery hook-up and all will be well. One other thing. Give the propeller the least possible pitch. Not only will you get more speed but the hum will be very realistic. •

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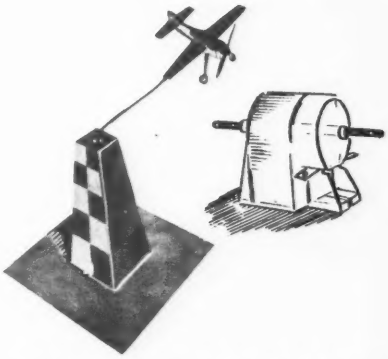

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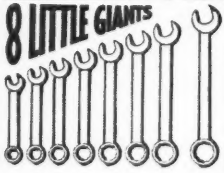

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Radio Diagrams

[*Continued from page* 153]

Radio circuits consist essentially of combinations of coils, condensers, and resistors, connected to tubes and incidental control equipment. As a matter of convenience, radio men refer to hookups of coils and condensers as "LC circuits," and to mixtures of resistors and condensers as "RC circuits."

Everything is pretty simple so far, eh? Learning to sling the lingo is half the trick.

A switch that turns a set on and off is invariably combined with the volume control. Since a switch opens or closes a circuit, it is represented on diagrams simply as a short arrowhead near a heavy dot. Its usual letter symbol is S or SW.

The symbol for a loud speaker is a perfect picture of its construction: a stubby triangle for the paper cone and a couple of curlicues for the "voice coil" (the small winding attached to the base of the cone).

The vacuum tubes used in radio and television sets range from miniatures the size of a thimble to the immense cathode-ray types on which the TV images appear. ("What's TV?" That's radio shorthand for television.) Some tubes have but two simple elements in them, others have a dozen. The outer container, the "tube" itself, is known as the "envelope" and is shown as a circle within which the heater, cathode, grid, and plate elements are drawn. Tubes are such a big subject that they will be treated in a separate article soon, but the information here will at least get you started.

The parts shown in Fig. 1 are for the *Heathkit* beginner's receiver. Let's assemble and wire this set and thus acquire some practical experience in the use of schematic diagrams. The receiver uses three tubes: one as a regenerative detector, another as an amplifier, and the third as a high-voltage rectifier. Two plug-in coils, fitting in a standard octal (eight-pin) tube base, give a choice of either the regular broadcast band or a shortwave band that includes police, fire, and some airplane frequencies. A punched-and-formed steel chassis measuring 4½x6 in. and a front panel measuring 4¾x6 in. hold all the parts.

Assembly is a simple nut-and-bolt job. The front panel is held against the edge of the chassis by the mounting collars of resistor R1 and Jack J and the two screws through the feet of T1 (see Fig. 2). The sockets for T3, V1, V2 and V3 line up neatly. Condenser C2 is fastened to the rear lip of the chassis. Condenser C4 and loud speaker LS fit on the front panel.

Figs. 3 and 4 show the first half of the

wiring. The little numbers on the tube symbols and T3 represent the actual pin markings of the standard octal sockets, as viewed from the *bottom*. The numbers start with 1 approximately where 7 o'clock would be on the face of a watch and run clockwise. At this stage, the power line, the rectifier tube V3, all the filaments (pins 2 and 7), and a couple of condensers and resistors are in. Condenser C4 appears to be floating in air; the movable plates are automatically connected to "ground"—the metal chassis of the set—because the framework of the unit touches the front panel. This saves one wiring operation. The "ground" symbols represent any nearby point of the entire chassis. Since it is difficult to solder to steel and virtually impossible to solder to aluminum, make ground connections to soldering lugs put under any convenient mounting screws. All the wiring so far is on the underside.

Figs. 5 and 7 show the completed receiver and Fig. 6, the entire schematic diagram. The underside has acquired more resistors and condensers and the top side, the R3-C5 combination, the transformer T2, and the loudspeaker connections.

Note that the schematic gives no indication of the physical placement of the parts. It's not intended to; this information must be obtained from photos or line drawings.

The symbols shown are pretty much standard throughout the radio art. However, the method of indicating crossovers and connections is subject to troublesome variations. Certainly, a crossover is best pictured by making one line jump the other by means of a semicircle, and this is favored in publications that have some consideration for constructors. Straight intersections or meetings, without the semicircle, can then safely be considered as connections, with a heavy dot sometimes added to make the point unmistakable. In engineering practice the tendency is to drop the semicircles, because they take a few extra seconds, and to run all intersecting lines right over each other. A heavy dot is supposed to show a connection; no dot, no connection. Ink lines have been known to smear and dots have appeared in places where they shouldn't, and some interesting if expensive pyrotechnic displays have resulted in sets built from diagrams containing such errors.

In wiring a piece of radio equipment from a schematic, it is a good idea to mark off each connection on the diagram with a colored pencil as you solder the joint. Some such scheme is absolutely necessary if you wire part of a set on Monday night and don't get at it again until Thursday. When the entire diagram is colored up, you can be fairly certain that the job is finished. •

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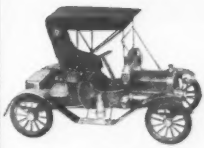

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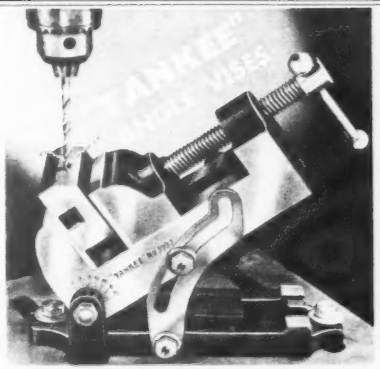

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"Green Thumb?"

[*Continued from page* 109]

in a given garden spot might be due to the deficiency, or excess, of these substances.

While the emphasis today is on a balanced diet, the commercial fertilizers contain nitrogen, phosphorus, and potassium in varying amounts. They also contain sodium, sulphur, calcium, etc., but these are merely by-products and should not be relied upon as present in sufficient quantity as a plant food.

Nitrogen promotes the growth of leaf and stem and gives vigor, color, and increased size. Its sources are sodium and calcium nitrates, ammonium phosphates, sulphates, cottonseed meal, sewage sludges, etc. Phosphorus promotes root growth and the production of fruit and seed. Bonemeal and superphosphate contain it. Potassium from wood ashes, etc., acts as a tonic. It toughens up even the shy violet and the delicate anemone. Potassium and phosphorus are likely to be present to a degree in all but worked-out soils. Nitrogen, however, is in constant demand. Unfortunately, it is the most expensive ingredient in commercial fertilizers. The wise gardener obtains plant food and humus at low cost from compost—a potpourri of lawn clippings, leaves, plant stalks, vegetable refuse, manure, sod, etc., partially decomposed by heat and bacterial action. To hasten the breakdown, superphosphate, lime, or a complete fertilizer is added.

There is a technique in making a compost heap. As the pile accumulates, it is built in a truncated pyramid of layers of various kinds of material. In its final form it is about 6 feet wide, 5 feet high, and of any length. The ground layer is usually corn stalks, straw, or turned-over sod to a depth of about 6 in. On this, 3 in. of fresh manure is added to supply heat for decomposition. The layers above this may be of any organic material alternating with manure. Decomposition requires from six to 12 months. This is hastened by wetting the pile in dry weather, spading it over at intervals, and adding chemical reducers.

A few tips on compost materials. Instead of burning leaves, add this valuable food to the pile. Acid-forming oak and beech leaves, however, should not be included, but may be dug directly into the soil for rhododendrons, azaleas, and other plants that favor acid conditions. No diseased plants should be thrown on the pile—better burn these.

Commercial fertilizers supply plant food in an immediately available form and can be applied at intervals during the growing season either by side-dressing the plant rows or by mixing the fertilizers with water and soaking

[*Continued on page* 164]

Witch Doctors Are Back

[*Continued from page* 64]

who occasionally sold them to the patients. Its benefits were supposed to come from color and ozone. You just placed your feet over the base of the unit and held the applicator over the affected part while you looked into the colors. Sold as a treatment for infantile paralysis, blindness and other afflictions, its manufacturers said it was handy for purifying air in funeral parlors, too. This was forced off the market quickly!

Take the case of the promoters of the "magic spike." This was a metal cylinder the size of a large fountain pen with a safety pin for attachment to clothing. The treatment was simply to wear it. It had a good sale despite the staggering price of $300. Its sellers claimed it cured heart trouble, asthma and a dozen other ailments. The spike's "remarkable" results were supposedly obtained from a mysterious chemical action known as cellular massage, said to be motivated by a chemical substance in the cylinder. This was barium chloride—a violent cathartic.

An old bachelor with high blood pressure and asthma claimed he used the spike for a short time, quickly regained his health and married three times.

Another near-invalid who allegedly broke his leg in three places, gave a testimonial stating he was physically active within two weeks after a friend tied a magic spike to his cast. Then there was a woman in Texas who said she used the spike to cure her poodle of distemper.

The company is said to have sold 450 of the magic spikes during the course of a "good year." That would make a total sale of $135,000! According to a rumor spread just before legal action was taken, they were making plans to sell a giant economy size at the bargain rate of $1000!

A repeater who was forced out of business last year was a former resident of Bombay, India, who settled in New Jersey. He developed a fancy-looking machine which focused colored lights on diseased portions of the body and "normalized" the tissue by treating it with exactly the right color combination. That's what the man said.

"Health" gadgeteers prey on millions of Americans every year. Even though many of the promoters are self-deluded believers in their own contraptions, the ailing public is victimized and the harm done can't possibly be exposed in mere statistics.

The law regulating these therapeutic devices has been in effect for 10 years. And we in the Food and Drug Administration assure you that we will continue to do everything in our power to protect you. •

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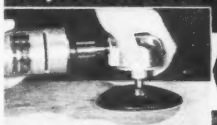

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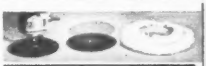

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Dealer In Dreamboats

[*Continued from page* 154]

despite advertising. Ralph had his parents take a couple of small boats in the car and several Mercurys on the trailer, then show the motors around the Sound. His father and mother were away only five days and ran the Mercury motors from six to eight hours each day. Before his parents returned to City Island, inquiries started rolling in. Ralph has been selling between 25 and 30 Mercurys a month ever since.

Eighty-five per cent of Cochran's current $100,000-a-year business comes in boat and motor sales, with 5 per cent repair work and the remaining 10 per cent in accessories.

Despite Cochran's modest remarks about his business ability, he's built up a solid, fast-growing enterprise. Each day more trade comes in, as customers spread the word about this unique boating service. For everybody loves a dreamboat. That's the only thing Ralph Cochran will let you buy—your own personal dream of a boat, be it racer or row boat—when you walk into his marine showroom! •

Trellis Fence

[*Continued from page* 107]

For a 26-foot span, I set up four posts on 8-foot centers. The furring strips work out nicely to this length without waste. The one-foot space at each end permits access to the back of the trellis for trimming purposes. Since I wanted the trellis to act as a screen as well as a support for flowers, I used 12-foot posts sunk five feet in the ground. On the remaining seven feet, I nailed 21 strips, spaced their own width apart.

The main work was not putting up the posts or strips, but preparing the posts. You'll be short-changing yourself if you stick these into the ground without creosoting them. Wait for a warm, dry day; then paint on creosote until the wood doesn't take any more. Apply this preservative up to about a foot higher than the expected ground line. Put the posts in the garage, let them sit overnight, and in the morning give them another dose.

Don't try to economize on the buried section of post. Unless at least one-third of the post is underground, in a well-tamped hole, it will become noticeably loose when you start nailing the furring strips in place. This is the sort of job you do only about twice in a lifetime, so do it right. If you want to be fancy, buy a bag of cement and a couple of bushels of sand and set the posts in concrete. I helped a neighbor do this for a front fence, and I don't recommend it to people who lead sedentary lives. The stuff is heavy! •

New York to California

[*Continued from page* 91]

Other problems involved include (1) the possible "canning" of the reactor elements to avoid contamination of the working fluid (in the case of jet engines, compressed air), (2) the transfer of working heat to the expansion chamber without slowing down the airflow and (3) the dissipation of excess heat generated by atomic fission. That heat hits the incredible temperature of 600,000,000,000 degrees! Solutions of these difficulties probably will give rise to other problems that will cause some scientific head scratching before final development of a practical working model.

Designing an airframe around an atomic powerplant poses an entirely different set of problems from those that come up in planning a conventional aircraft. Obviously, you can't mount the engine in the nose or on the wings without rendering the plane "hot" and exposing its crew and passenger quarters to radiation danger. The only logical place for the engine is in the extreme tail section where dissipation of radioactive exhaust won't affect any part of the plane.

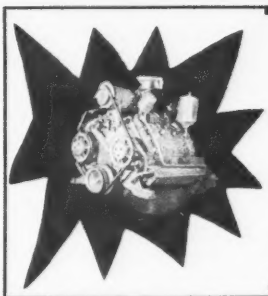
So, the airframe for our atom-powered plane will have to be the "canard" or tail-first type. In this reverse-style aircraft, the main wing is in the rear, with the center of gravity just forward of its leading edge. The canard, therefore, can carry our weighty power plant and still give us good balance. It also lends itself to the pencil-slim fuselage best adapted to the ultra high-speed flight necessary to make the great cost of using atom power worth while for aircraft. In this design the craft's needle point forms a "mach cone" of shock waves that allows the stabilizer and main wing to travel safely in their wake. Some of our most efficient guided missiles follow this form for the same reason.

Now we come to the question of the most suitable wings for our airliner. For takeoff, landing and subsonic speeds up to 600 mph, a straight wing is desirable. Traversing the transonic zone, however, from mach .85 to 1.08 (mach 1 is the speed of sound), a swept-back form is necessary to evade shock waves.

After passing through this turbulence and zooming into supersonic speed, the straight wing again becomes preferable. As Smith J. DeFrance, director of N.A.C.A.'s Ames Aeronautical Laboratories, points out, the turbulent transonic speed zone makes a wing you can adjust to any angle of sweepback a virtual necessity for safe flight at supersonic speeds. For our atomic express, therefore, we shall adopt the variable wing.

We can draw the landing gear, too, from

[*Continued on page* 162]



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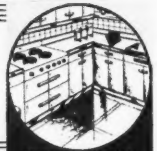

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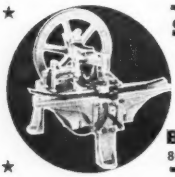

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New York to California

[*Continued from page* 161]

existing aircraft models. Unlike conventional aircraft, which exhaust most of their fuel in flight and land at reduced weights, the atomic craft will have to land at its full, takeoff tonnage. The landing gear thus must be very sturdy, in addition to being carefully streamlined for supersonic flight. Introduction of "bicycle-type" gear allows the strong, bulky wheels to fold away cleanly into thin wings.

This arrangement, successfully used on the heavyweight Boeing B-47 and the Martin B-48, consists of two main-wheel trucks, mounted in tandem beneath the ends of the fuselage. A pair of light, auxiliary wheels, mounted below the wings in the outboard engine nacelles, steady the machine when it's at rest or taxiing slowly. This type of gear is perfectly suited to our atomic transport.

At this point we have all the essential elements for our atomic airplane. Let's get to work on the drawing board. As you've noted in our illustration on pages 88-89, MI's Atomic Airliner takes off like a slender, streamlined missile, suggesting the name "Silver Arrow."

Manned by a crew of five—pilot, second pilot, radio operator, navigator-radarman and stewardess—the Silver Arrow carries 48 passengers in a single, pressurized chamber extending from the pilot-house back to the main wings. The liner has staterooms, lounge, lavatories and galley but no sleeping accommodations. Because of its great speed, the runs are all too brief for sleeping.

To avoid contamination of airports, the plane takes off and lands under auxiliary, liquid-rocket power. All control surfaces are double, with a narrow-chord trailing-edge section that functions only at high speeds. The wingtips are faired in bullet shape and contain landing navigation lights and parachute brakes for short runway landings.

And there you have it—a preview of the world's first Atomic Airliner. Everything in it has been tested or at least projected during the current research on the problems involved in atom-powered aircraft. The wing areas as shown in our pictures may be a bit off one way or the other because we still lack the precise data on the nuclear powerplant and on the anti-radiation shields.

After all, these are some of Uncle Sam's prize secrets and we can hardly expect him to reveal all the details before his first atom plane is finally ready for takeoff. But, take a good look now and see if we haven't bulls-eyed the main features—when that 10,000-mile-an-hour airliner really does flash across the continent in "minus three hours." •

I Build Fire Engines

[*Continued from page 71*]

business like mine with a capital of about $300 cash—but you'll need about $10,000 worth of guts and ingenuity. And if you're starting on a shoestring, you must be able to make one tool do the work of four, devise tools from odds and ends and stick it out when the going gets tough.

You can begin with just a few special tools. In addition to the usual hand tools, I had only a small lathe, a small power saw, a belt sander and a drill press. And I got along with those until production required more and the money was rolling in to pay for more.

For instance, when I started I used solid wooden wheels but I wasn't satisfied with them. I bought an inexpensive toy plastic modeling outfit, had some wheel dies made, rearranged the die-holding setup to fit it and increased the intensity of the heating chamber. I was able to do a perfectly satisfactory job until I could afford to have the wheels made by a commercial outfit.

The question of *what* to make was easy for me. Ever since I was a kid, I've loved fire engines so it was natural that I should turn to them. But I believe that anybody can build a business like mine. If your hobby is old sailing boats, early automobiles or period furniture—work with models of those things. You'll do best with them and you'll enjoy working most with models with which you are most familiar.

After you've got your business set up, your main problem will be marketing your product. After I made my first kits, I sent a couple to my sister-in-law in Chicago. She invited a friend over to help her put the first one together and her friend had so much fun with it he took the model around to a friend of his who's in the wholesale toy business. A few days later the wholesaler wrote to me asking for prices and shortly after that he sent me the first of a series of orders. Since then, I have used magazine advertising successfully, too. But word-of-mouth advertising brings in a continuous flow of orders.

I've been in business since March, 1947, and with just a small shop set up in the cellar of my home in Braintree, Mass., I've sold 20,000 kits ranging in price from $2 to $6.50. I'm certain I could have sold about 25 per cent more, but I've had to learn things and solve a few problems.

Frankly, I don't expect to become wealthy in this business and neither should you. It just doesn't seem to have million-dollar potentialities. But it does offer a good living right from the start. And best of all it makes a game of making money. •

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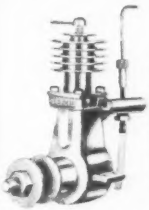

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"Green Thumb?"

[*Continued from page* 158]

the ground. Special fertilizers are now being mixed for special crops—for roses, corn, potatoes, etc. Such preparations are used when the best results are desired.

It is all very well to know what food plants require, but it is much more important to determine whether it is present in the soil. If we do not know this, we may buy general fertilizers when the soil is deficient in but one or two elements. Further, we must know whether the soil is sweet (alkaline) or sour (acid) because some species tolerate but one state. The answers must be determined by testing the soil.

Ordinary soil tests do not require any particular skill. Kits for the purpose cost but a few dollars. Samples of the soil are placed in test tubes and prepared chemicals added. After the sediment has settled to the bottom of a tube, the liquid is matched with color charts indicating the presence or absence of various soil components. Tables show the amounts of these substances required for the successful growth of various plants.

The importance of such tests cannot be exaggerated, particularly with regard to sweet or sour soils. Many crop failures can be attributed to attempts to grow certain crops on the wrong soil. For example, potatoes and asparagus cannot be grown together, nor clover and bent grass on the same lawn—that is, not successfully.

Water is the vehicle which food is taken up by plants. When nature fails to supply sufficient moisture, the gardener must make good the deficiency. A water pipe to the garden will save a lot of work. Plants should not be sprinkled lightly. Instead, the ground should be thoroughly soaked.

The watering problem can be reduced by conservation of natural moisture through mulching. Chopped straw, peat, etc., spread around the bottoms of the plants, prevents the sun from drying out the soil. The effort is repaid by the fact that weeds are checked and cultivating is avoided. It is a case of using your head to save your back.

Thorough preparation in the spring also saves labor later on. The compulsion for getting things into the ground quickly impels some to slight this, but they pay for it later when great effort is required to remove weeds and supply plant food during the growing period.

We have skipped over a lot of things. Still, the suggestions we have given here, if put into practice, will do some good. If you will look at your thumb, you may notice that it is taking on a greenish hue. •

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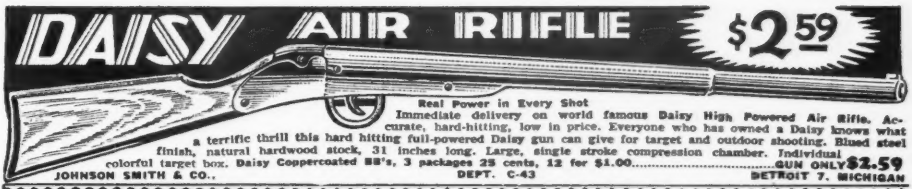

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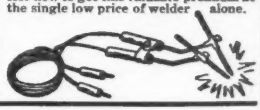

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Gadgets for More Fish

[*Continued from page* 74]

or net (not shown), has ball lock to hold extended. Lawrenz Products, Chicago, Ill. Complete with net: $8.95

17. *Mae West* is handy for the fisherman who wades deep water. Pull a ring and it inflates with air from small cylinder, becoming a life jacket. Sold at any Army Surplus store or Modell's, New York City. $2.50
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19. *Net Ring* pins to your fishing vest or jacket. Tie or clip your net handle to it. Abercrombie and Fitch, New York City. $.85
20. *Pal Clip* has a clipper for flies, hook disgorger and awl for opening hook eyes. H. C. Cook Co., Ansonia, Conn. $.75
21. *Plastic Fly Case* made of Vinylite fits flat in your pocket. It's waterproof and mothproof. Anglers Products Co., Elmhurst, N. Y. $2.00
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23. *Gadgeteer* will straighten hooks and come in handy wherever a hammer is needed. Abercrombie and Fitch, N. Y. C. $.60
24. *Fly Retriever* will recover your fly when it snags a tree branch. Goddeyne Mfg. Co., Bay City, Mich. $1.50
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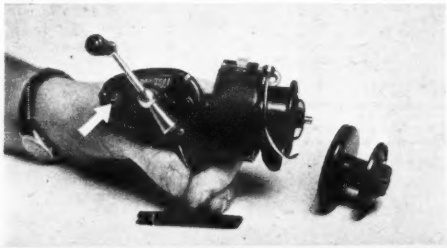
Mitchell reel has interchangeable spools. Pressure on center of shaft releases spool for changing. Arrow points to knurled screw which provides click and lock to prevent unwinding when netting fish.



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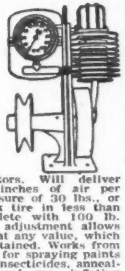

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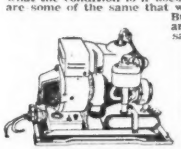

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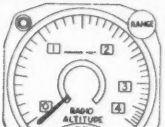

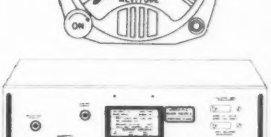

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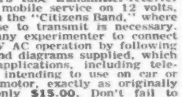

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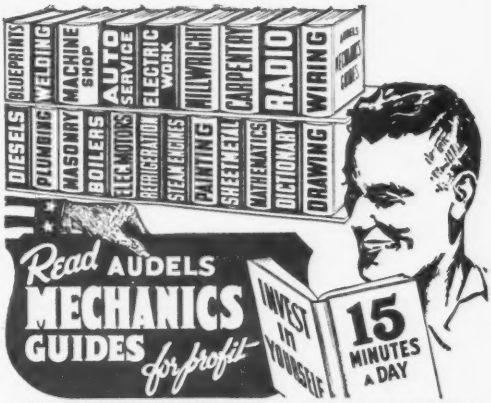

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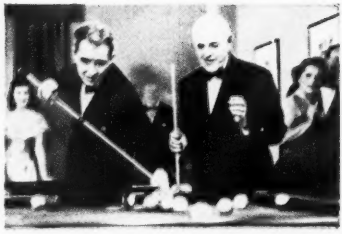

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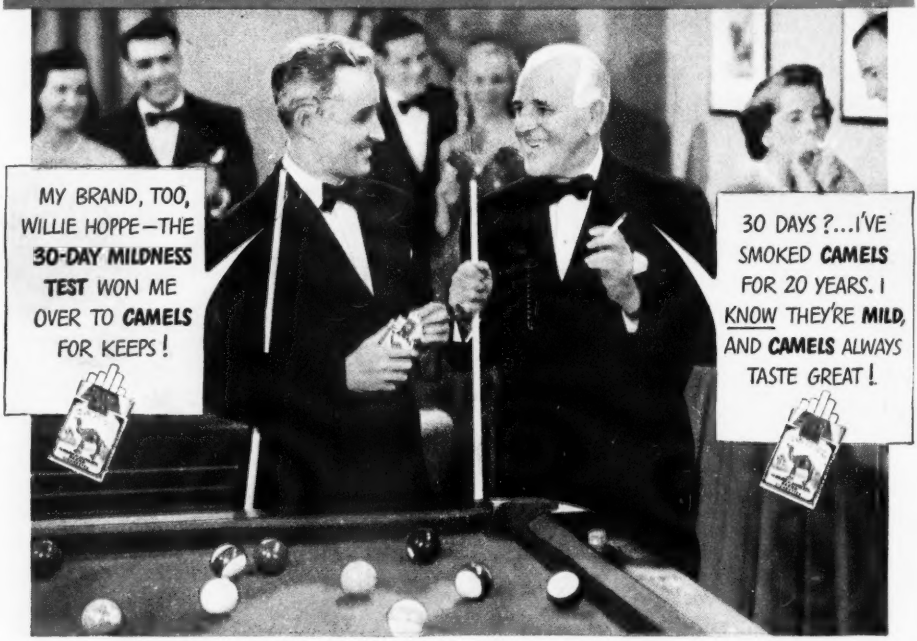

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